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MARGINS on FLUID MILK
in the
Duluth-Superior Marketing Area
1947-48

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CONTENTS

	Page
Summary	ii
Purpose and scope	1
The market and its characteristics	2
Federal regulation	2
State and local regulation	3
Market operations	3
Servicing of the market	4
Handlers covered by the study	4
Producer-handlers	4
Multiple-unit discount plans	7
Sources and procedure	9
Sales data	9
Distribution by channel of sale, type of milk, and container size	11
Distribution by city	14
Selling prices	14
Retail prices	15
Wholesale prices	17
Changes in selling prices	18
Cost of milk	20
Method of determining product cost	20
Unit and composite cost related to butterfat content	21
Margins	23
Composite margins on fluid milk	23
Average margins by type of milk and channel of sale	26
Unit margins	27
Differences among container sizes	27
Differences among retail items	28
Differences among wholesale items	29
Ranges in margins	29
Simple price spreads	29
Average price under multiple-unit pricing plans	34
Duluth discount plan	34
Superior discount plan	35
Estimating proportion subject to discount	35
Formula method	35
Graphic method	36
Determination of price structure from desired average price	36
Appendix A - Detailed statistical data	39
Appendix B - An illustration of the computation of the cost of milk	54
Appendix C - Supporting charts	55

SUMMARY

The study of milk prices and handlers' margins in the Duluth-Superior marketing area, on which this report is based, covers a 2-year period and provides weighted average prices, costs, and margins for all fluid products sold in the area as well as for the individual items. It offers handlers in the Duluth-Superior marketing area a basis for comparing their individual average margins on fluid milk with a market-wide average, and offers the industry generally a basis for comparing margins in Duluth-Superior with those in other markets for which complete information is available on sales, prices, and butterfat tests of milk sold. Such comparisons are commonly made in terms of simple price spreads computed from the price of a quart of "standard grade milk delivered to homes in quart glass bottles." But the simple price spreads do not give an accurate measure of average margins; in this study the simple spreads on sales at retail were from 0.5 to 0.9 cent per quart higher than the weighted average margin.

In addition to showing the results of using a more accurate method of computing handlers' margins than the method commonly followed, this report contains a graph and a formula for determining the prices to charge consumers of fluid milk, when quantity discounts are offered, in order to obtain a desired average price per quart; it also contains much detailed data showing volume of sales of different types of milk, by size of containers at retail and at wholesale, and the margins on each item.

MARGINS ON FLUID MILK IN THE DULUTH-SUPERIOR MARKETING AREA, 1947-48

By Anna A. Schlenker and Eleanore J. Parker,
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PURPOSE AND SCOPE

"Standard grade milk delivered to homes in quart glass bottles" is one of many items sold by a milk distributor. It accounts for a large part of the total sales of bottled milk products in most cities. The price spread on this item is commonly used as an indicator of changes in marketing costs and efficiency from time to time in a given city, or between different cities. But if it is important that such comparisons be accurate, rather than approximations, the margin being compared must be an average for all fluid products sold.

The study on which this report is based was undertaken to measure and compare the simple margin on single items and weighted average margins on all bottled milk items in the Duluth-Superior market over a 2-year period. It provides a basis for comparing the margin in this market with margins in other markets, and it shows the changes within the market during the period covered. Further than that, detailed information about the margins for different items, and the relative volumes sold, explains the difference between the simple and weighted average margins.

Milk handlers ordinarily possess records enabling them to calculate their own weighted average margins. This report makes available to Duluth-Superior handlers a market-wide average, enabling individual handlers to determine the extent to which the pattern of their own sales gave them wider or narrower margins than the market average during the period covered by the study. It also provides them with a rapid method of measuring the effect of possible changes in price on their margins -- particularly the effect of changes in prices for quantity purchases.

The public generally does not have access to information of the sort contained in this report. Thus, many of the details and the method of the study as well as the final results should be useful to research workers and others dealing with problems of farm-to-consumer margins on fluid milk. 1/

1/ The term "fluid" is generally used to refer to the form in which milk or cream is purchased by the ultimate consumer. That is, milk is considered to be fluid if it is sold as milk, and cream is fluid if sold as cream. In this study, the term "fluid" is used to include whole milk, flavored milk and milk drinks, and skim milk; it does not include buttermilk, which was not made a subject of this study.

THE MARKET AND ITS CHARACTERISTICS

The minimum prices payable to producers for the Duluth-Superior milk marketing area are regulated by Federal milk Order No. 54, which became effective on May 5, 1941. The marketing area comprises the cities of Duluth and Cloquet in Minnesota, and Superior in Wisconsin.

According to the 1950 Census, the area had a population on April 1, 1950, of 147,521, an increase of 2.8 percent over the 1940 Census count. Duluth had a population of 104,511, an increase of 3.4 percent; Cloquet, 7,685, a 5.2 percent increase; and Superior increased 0.5 percent to 35,325.

Federal Regulation

For the period covered by this study, Order No. 54 provided that milk received from producers by handlers be accounted for in three classes. Class I included all whole and skim milk used in fluid form, and all flavored milk or milk drinks so used, excess shrinkage, and milk not specifically accounted for. Milk made into cream for fluid use was in Class II, and milk for all other uses (including buttermilk) was in Class III. The order provided for a market-wide pool under which a minimum uniform blend price, payable to all producers, was computed from prices established according to the order. Minimum class prices and the minimum blend price were established for milk containing 4 percent butterfat. The order provided a butterfat differential, computed according to a stated formula, for adjusting the announced 4 percent blend price to a price for milk of any other butterfat content. By implication, the same butterfat differential applied to all three class prices. 2/

Handlers who received their milk supply directly from producers were subject to the regulatory provisions of the Federal order. Although the "full supply" handlers were not subject to the pooling or pricing provisions of the order, they were indirectly affected by the pricing provisions because their supplier had to pay the minimum prices established in the order. 3/

2/ Only one butterfat differential is established by the order, and that differential is used to adjust a handler's total cost of milk, which is computed from the class prices. For example, if a handler's purchases of milk from producers contained 3.5 percent butterfat, and he used his entire supply of such milk as Class I, his cost per hundredweight would be the Class I price less an adjustment for 5 points of butterfat at the differential established for the blended price. Likewise, if a handler purchased milk containing 4.5 percent butterfat and used 50 percent in Class I, 25 percent in Class II, and 25 percent in Class III, the per hundredweight cost of his entire supply would be made up of 50 percent of the Class I price, 25 percent of the Class II price, and 25 percent of the Class III price, plus an adjustment for 5 points of butterfat at the differential established for the blended price.

3/ "Full supply" handlers purchase their entire supply of milk from other handlers; they buy none directly from producers.

"Producer-handlers," 4/ to the extent that they distributed only their own production, were not subject to the pricing provisions of the order. However, if they supplemented their production with purchases from handlers who were fully regulated, their cost of milk so purchased was similarly affected by the minimum order price.

State and Local Regulation

All three cities of the Duluth-Superior marketing area have adopted milk ordinances patterned after that recommended by the United States Public Health Service.

Neither Wisconsin nor Minnesota has legislation establishing wholesale or retail prices of fluid milk.

Market Operations

Only a few grades and types of milk were sold in the Duluth-Superior market during the period of this study. Except for small quantities of Golden Guernsey milk distributed by two handlers, only one grade of whole milk was sold: Standard-grade milk meeting the requirements of State and local regulations. Some of this milk was homogenized and some had added vitamin D, but no additional charge was made for these "extras" whether supplied separately or together. 5/ Skim milk and flavored milk and milk drinks were sold in limited quantities. Nearly all the flavored product sold in the area was chocolate, and most of it had a butterfat content of approximately 2 percent, though some had a lower content. A very small quantity was flavored whole milk. 6/

The Duluth market adopted alternate day delivery of milk to homes during the war emergency, and this economy measure has been largely maintained since then. Other economies were effected through the operation of a bottle exchange and a policy of requiring a 5-cent deposit on bottles in both wholesale and retail distribution.

About 1,200 producers supplied pool handlers with the approved milk needed for the market. In addition, handlers purchased sizable quantities of milk and cream from other sources. Such "unapproved" milk served to utilize more fully the manufacturing facilities in handlers' plants, and at times, under emergency permit by the health authorities, it was used to fulfill the market requirements of fluid milk and cream.

4/ Handlers who receive no milk from producers and who produce all or part of their supply on their own farms.

5/ In many other markets homogenized milk with vitamin D is sold at a premium of 1 to 2 cents per quart.

6/ The term "milk" (as in "chocolate milk") may be applied only to a flavored product made from whole fresh milk. Any product not meeting the minimum standards for whole milk must be labeled "drink" rather than "milk."

Table 1 shows the total quantity of milk and cream handled in the market and a summary of its utilization. In November 1947 the butterfat in milk received from producers was less than the butterfat sold in milk and cream, whereas in November 1948 receipts barely exceeded sales. 7/ Butter and ice cream together accounted for most of the butterfat remaining after fluid milk and cream needs were met. Butterfat was also used in buttermilk, whole milk cheese, and cottage cheese. The skim milk derived from separation was used for buttermilk and cottage cheese, and surpluses were manufactured into nonfat dry milk solids and sweetened condensed skim milk.

Servicing of the Market

In May and November 1947 the market was serviced by 10 handlers who received milk from producers, 4 full supply handlers, and 7 to 12 producer-handlers. In May and November 1948 the market was serviced by 9 handlers receiving milk from producers, 5 full supply handlers, and 5 producer-handlers. 8/

Handlers covered by the study

Approximately 2.1 million quarts of milk were sold monthly in the Duluth-Superior marketing area by 14 handlers whose records were available for this study. Of these, 10 were located in Duluth, 2 in Superior, and 2 in Cloquet. With two exceptions, the handlers generally confined their distribution of milk to the cities in which they were located. One of the handlers located in Superior also sold in Duluth, whereas one Duluth handler also sold in Cloquet. Thus, 11 handlers sold milk in Duluth, 2 in Superior, and 3 in Cloquet. Some handlers also supplied limited areas outside the marketing area. Although the 3 largest handlers accounted for about 50 percent of all the milk distributed in the market, the milk distributing business in Duluth-Superior was nevertheless not so concentrated in the hands of a few large handlers as in some other cities.

Sales during the period studied indicate a change toward greater concentration of sales among the large handlers (table 2); this came about primarily at the expense of the third largest group.

Producer-handlers

In May 1947 producer-handlers distributed an estimated 125,000 quarts 9/ of milk or about 5.5 percent of the total quantity of fluid milk sold in the marketing area. By November 1948 the figure had declined

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7/ It is generally considered that markets need a supply of 10 to 15 percent above average fluid milk and cream sales to cover daily and week-end fluctuations in sales and receipts.

8/ In addition, one handler, selling chiefly outside the marketing area, sold some milk to handlers in the marketing area.

9/ Estimated at 95 percent of producer-handler production.

Table 1.--Source and utilization of milk received by handlers in the Duluth-Superior marketing area, May and November, 1947 and 1948

Source and utilization of receipts	May 1947		November 1947		May 1948		November 1948	
	Milk or cream	Butter-fat	Milk or cream	Butter-fat	Milk or cream	Butter-fat	Milk or cream	Butter-fat
	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds
Source:								
From producers 1/	9,459	382	4,600	199	8,900	359	5,497	238
From other sources	4,910	171	1,622	96	4,371	207	2,462	125
Inventory variation	- 62	- 11	- 38	- 1	- 93	- 66	56	35
Total receipts	14,307	542	6,184	294	13,178	500	8,015	398
Utilization:								
Fluid milk 2/	4,966	175	4,720	168	4,809	169	4,919	173
Fluid cream	243	67	204	57	222	60	207	55
Manufacturing and other	9,098	300	1,260	69	8,147	271	2,889	170
Total	14,307	542	6,184	294	13,178	500	8,015	398
Principal manufactured products (included above):								
Butter		166		28		148		84
Ice cream		105		28		97		54

1/ Includes receipts from handlers' own farms and producer-handlers.

2/ Represents sales of whole milk, skim milk, and flavored milk inside and outside the marketing area, and unaccounted for fluid milk. Includes sales of milk produced on pool handlers' own farms and by producer-handlers.

Table 2.--Average daily sales of fluid milk and percentage of total sold by handler groups, Duluth-Superior marketing area, May and November, 1947 and 1948

Handler group by average daily sales per handler	Handlers	Average daily sales of group				Sales as percentage of total			
		May 1947	Nov. 1947	May 1948	Nov. 1948	May 1947	Nov. 1947	May 1948	Nov. 1948
	Number	Quarts	Quarts	Quarts	Quarts	Percent	Percent	Percent	Percent
Group I: 7,500 qts. or more	3	33,568	33,449	33,657	36,734	48.3	48.5	49.4	52.3
Group II: 5,000-7,499 qts.	3	19,610	18,924	19,516	19,185	28.2	27.4	28.7	27.3
Group III: 2,000-4,999 qts.	4	11,645	11,968	10,228	9,624	16.7	17.4	15.0	13.7
Group IV: less than 1,999 qts.	4	4,736	4,646	4,702	4,658	6.8	6.7	6.9	6.7
Total	14	69,559	68,987	68,103	70,201	100.0	100.0	100.0	100.0

to about 60,000 quarts, or less than 3 percent of the total fluid milk distribution. Producer-handlers are generally thought to follow prevailing prices in the market less closely than most handlers. For this reason, and because the order does not provide as much information about the cost of milk to producer-handlers as to handlers, the milk distributed by producer-handlers was not made a part of this study. 10/

Multiple-unit Discount Plans

In 1943 handlers in the Duluth-Superior market adopted the practice of granting price concessions to retail customers buying in quantity. In Duluth (and later in Cloquet), a reduction of 1 cent per quart was granted on all milk purchased at retail by customers who bought 90 quarts or more in any one month. In Superior a reduction was made on each quart in excess of one quart delivered at a single stop. 11/ The discount was 2 cents per quart in May 1947 and 3 cents per quart during the other months studied. The Superior plan was applied on a daily basis, whereas the plan used in Duluth was applied on a monthly basis.

An analysis which was made of drivers' sales tickets for the month of December 1948 covering four retail routes, all in Duluth, provided a basis for studying the effect of these pricing plans on the average return to the handler. The sales data revealed that, although 25 percent of the customers purchased milk in quantities of less than 24 quarts per month, these customers bought less than 9 percent of all the milk (table 3). At the other extreme, 2 percent of the customers bought milk in quantities exceeding 104 quarts monthly, and these accounted for roughly 6 1/2 percent of all milk sold. Thirty-two percent of the customers, the largest group, bought between 24 and 39 quarts monthly and accounted for 24 percent of sales (fig. 1).

From the data in table 3 it is evident that only a small percentage of customers (6 percent) obtain any advantage from the Duluth pricing plan. Only 16 percent of the milk is sold at the reduced price. Consequently the average margin on all sales is affected very little by reducing the price on quantities over 90 quarts. The proportion of customers who receive discounts through the pricing plan operative in Superior, on the other hand, is much larger, and the over-all margin is lowered much more.

As price reductions under the Duluth plan are granted to customers regardless of the number of quarts delivered per stop at a customer's door, that plan is likely to have less effect on the quantity of milk

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10/ Some handlers who receive their main supply from producers also operate their own farms, the production of which is disposed of along with producer milk. Such milk was regularly reported by handlers and is included in this study.

11/ This is the plan generally known as the "Elwell Plan." It was named after Edwin S. Elwell, who was chiefly responsible for its inauguration in the Minneapolis market in March 1939.

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Figure 1.--Percentage of total quart sales of milk on four selected retail routes in Duluth, Minn., by monthly purchase per customer, December 1948.

Table 3.--Percentage of total number of customers and percentage of total quart sales of milk on four selected retail routes in Duluth, Minn., by monthly purchase per customer, December 1948

Monthly purchase per customer (quarts)	Percentage of total		Cumulative percentage of total	
	Number of customers	Quart sales of milk	Number of customers	Quart sales of milk
	Percent	Percent	Percent	Percent
1 - 7	3.96	0.40	3.96	0.40
8 - 23	21.31	7.91	25.27	8.31
24 - 39	32.11	24.06	57.38	32.37
40 - 55	16.44	18.46	73.82	50.83
56 - 71	11.87	17.92	88.69	68.75
72 - 87	7.61	14.29	93.30	83.04
88 - 103	4.72	10.54	98.02	93.58
104 - 119	.61	1.61	98.63	95.19
120 - 135	.92	2.73	99.55	97.92
136 - 151	--	--	99.55	97.92
152 - 167	--	--	99.55	97.92
168 - 183	.15	.62	99.70	98.54
184 - 199	.15	.70	99.85	99.24
200 - 215	.15	.76	100.00	100.00
Total	100.00	100.00	--	--

delivered at one stop than the Superior plan. It may nevertheless be useful as a means of discouraging customers with large monthly home deliveries from shifting to store purchases of milk at lower prices. In addition, the plan may induce a few customers to purchase more milk than they otherwise would, since under certain conditions they could obtain several additional quarts of milk without adding to their total milk bill. The Superior plan, however, is designed not only to encourage home delivery of milk, but also to reduce delivery expense by curtailing the number of stops made at a customer's door. Under this plan even a small buyer could reduce his monthly milk bill merely by having fewer and larger deliveries.

SOURCES AND PROCEDURE

Sales Data

Each handler, under Order 54 for the Duluth-Superior marketing area, reports the total quantity of his sales classified in a manner prescribed by the market administrator. These handlers' reports, adjusted for any errors disclosed by the market administrator's audit, provided the basic data for the classification of milk in this study.

The report forms provided for separating sales into two main categories--wholesale and retail. They provided for further division as to type of milk sold: Standard grade, homogenized, flavored milk and milk drinks, Golden Guernsey, and skim milk. Sales of these were to be further subdivided by size of container: Bulk (that is, gallon or larger size containers), quart, pint, and half pint. 12/ Not all handlers, of course, sold milk of each type nor in each size container. Handlers paid the same price for milk used in homogenizing as they paid for standard milk of the same butterfat content, and their sale prices were the same for both homogenized and standard milk. For this reason sales data for homogenized and standard milk were combined throughout the study. 13/

In the reports to the market administrator, sales at retail included all sales made by handlers direct to ultimate consumers. Most of this milk was delivered to consumers' homes, but sizable quantities were sold direct to consumers at one handler's retail stores. Negligible quantities of milk were sold direct to retail customers at handlers' plants.

Sales at wholesale included sales in bulk to such users as restaurants, hotels, hospitals, and other institutions for use in cooking or for individual servings; sales in pint and half pint containers to hotels, restaurants, schools, and factory employees' lunchrooms for direct service to consumers; and sales, mainly in quart containers, to stores for resale to the retail trade. This last-named category constituted by far the major part of reported wholesale sales and, together with the sales at the handler's retail stores, represented the total quantity of milk purchased by consumers at stores.

Throughout the study, sales at the handler's retail stores were combined with wholesale sales of standard milk in quarts. This was the most feasible procedure for several reasons. The volume could not be shown separately without revealing information regarding one handler's operations; the combination of such sales with wholesale milk represented the total quantity of milk purchased by consumers at stores; and the price at which this milk was sold was usually the same as the published wholesale price.

Handlers report an "average butterfat test" for each type of milk sold, but separate tests are not reported for wholesale and retail, nor for any further subdivisions by size of container. It is not clear whether all items of a given type have the same butterfat content in each channel of sale or in all sizes of containers, or whether different tests have been averaged for reporting purposes. (See p. 23.) For purposes of this study, however, it was assumed that the butterfat content reported for each type of milk was the same for each channel of sale and size of container.

12/ Some milk is packaged in paper containers, but it is not reported separately by handlers. It is sold at the same price as milk packaged in glass.

13/ For convenience, the term "standard" is used to describe the combined sales of standard and homogenized milk, and the term "flavored milk" is used to include flavored milk drinks.

In order to provide basic data for the computation of margins, the total pounds of milk 14/ and related pounds of butterfat were determined for each separate sales category having a distinctive cost element such as butterfat content, or a distinctive selling price. Two handlers reported slight differences between the butterfat content of homogenized milk and that of standard milk, but as market-wide information on homogenized milk was not available, no attempt was made to report the butterfat content of homogenized milk separately.

As the selling prices were not identical in all three cities of the marketing area, it was necessary to determine the sales (pounds of milk and butterfat) by cities. The reports of two handlers who sold in more than one city showed sales in each city separately.

Handlers were not required to report sales outside the area separately from sales within the area, and therefore outside sales were included except as noted. Milk sold in bulk to dealers outside the market represented so small a portion of total sales that any price difference would have had only a minor effect on the average margin for the market. Sales of packaged milk sold on routes which extended beyond the marketing area were presumed to have been made at the same prices as milk sold within the area.

One of the handlers reported separately, sales to dealers outside the area, and these were excluded from the tabulation because information was not available as to the prices at which such sales were made.

Full supply handlers also made detailed reports to the market administrator. Such handlers distributed from 36 to 41 percent of all milk sold in the market. This milk was almost wholly purchased in bulk and processed and packaged by the buying handlers. Therefore their reports were included to provide complete information for the market on the proportions of each type of milk sold in each channel of sale and by each size of container. Such sales, of course, have been eliminated from the sales of the supplying handlers.

Distribution by channel of sale, type of milk, and container size

Less than one-third of all milk sold in the Duluth-Superior marketing area was delivered direct to consumers' homes (fig. 2). As indicated in table 4, the percentage of all milk sold at retail declined steadily during the period covered by this study, from 31.9 percent in May 1947 to 29.6 percent in November 1948.

14/ Quantities of milk in various container sizes were converted at the following weights:

gallons -- 8.6 pounds	pints ------- 1.075 pounds
quarts -- 2.15 pounds	half pints -- .5375 pound

All types of milk (that is, whole, skim, flavored) were assumed to have the same weight. The weight of flavoring material and sirup, however, was subtracted from computed pounds of flavored milk to derive total fluid milk sales.

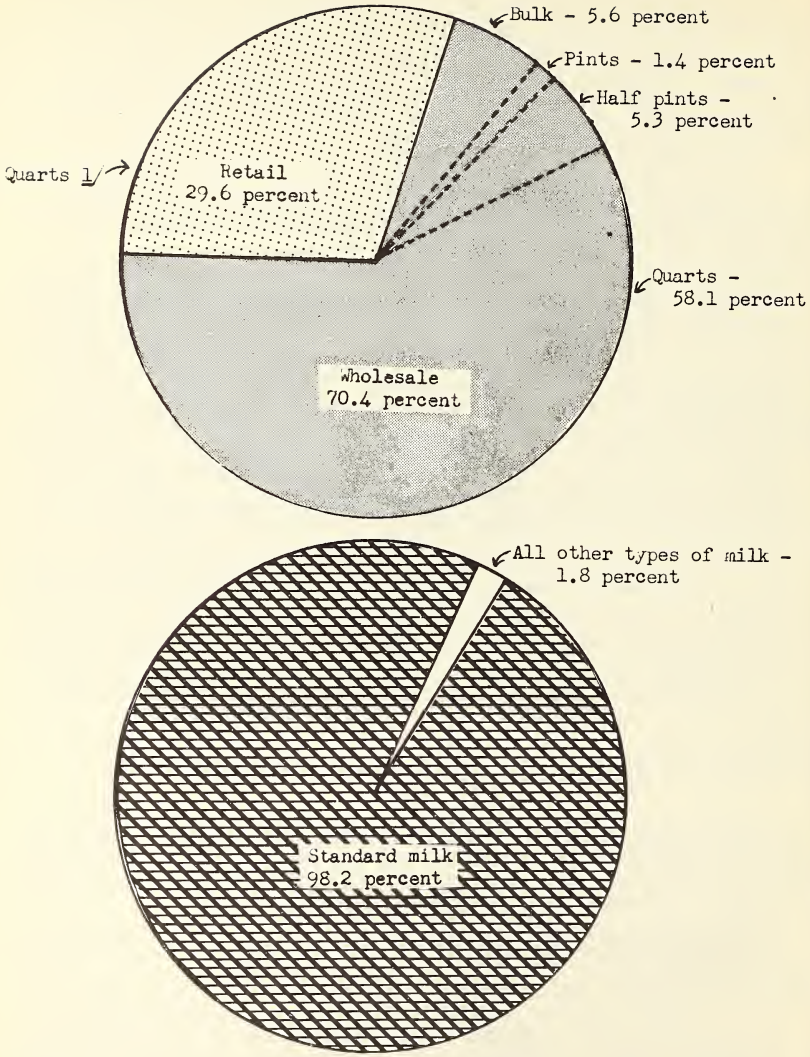
Bulk - 5.6 percent
Pints - 1.4 percent
Half pints - 5.3 percent
Quarts 1/
Retail 29.6 percent
Quarts - 58.1 percent
Wholesale 70.4 percent
All other types of milk - 1.8 percent
Standard milk 98.2 percent

Figure 2.--Percentage of fluid milk sales by channel of sale and container size and by type of milk, Duluth-Superior marketing area, November 1948.

1/ Less than 0.5 percent was sold in containers other than quarts.

Table 4.--Percentage of total sales of fluid milk by channel of sale and container size, Duluth-Superior marketing area, May and November, 1947 and 1948

Item	May 1947	November 1947	May 1948	November 1948
	Percent	Percent	Percent	Percent
Retail				
All types of milk and all container sizes 1/	31.9	30.9	30.8	29.6
Wholesale 2/				
All sales in quart containers	55.8	57.0	57.0	58.1
Bulk sales	6.1	5.9	5.7	5.6
Pints and half pints	6.2	6.2	6.5	6.7
Total wholesale	68.1	69.1	69.2	70.4
Total	100.0	100.0	100.0	100.0

1/ More than 99 percent of retail milk was sold in quart containers.
2/ Includes sales through handler's retail stores.

Conversely, sales to consumers through stores (as represented by wholesale sales of all types of milk in quart containers, including sales

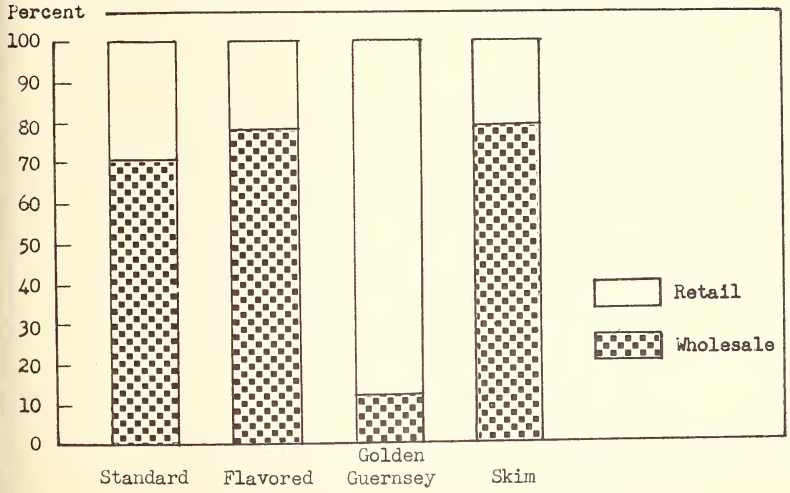

Figure 3.--Percentage of each type of fluid milk sold, by channel of sale, Duluth-Superior marketing area, November 1948.

at a handler's retail stores) increased from 55.8 percent of total sales in May 1947 to 58.1 percent in November 1948. Other wholesale sales, representing sales in small containers and in bulk to hotels, restaurants, hospitals, schools, and other institutions, accounted for slightly more than 12 percent of total sales in all 4 months of the study.

Standard milk, some of it homogenized and some of it with vitamin D added, made up about 98 percent of all sales during each of the months studied (fig. 2 and Appendix table 11). The other 2 percent was made up of flavored milk and milk drinks, Golden Guernsey milk, and skim milk.

Sales in quart containers made up nearly 88 percent of total sales, whereas bulk sales were 6.1 percent in May 1947 but declined to 5.6 percent in November 1948. Sales in pints and half pints accounted for the remainder, increasing approximately as much as bulk sales decreased.

The proportion of standard milk sold at retail declined from 31.6 percent in May 1947 to 29.3 percent in November 1948 (table 12, Appendix, and fig. 3). Sales of Golden Guernsey at retail, on the other hand, increased from 83.2 to 87.8 percent. The proportions of flavored milk and skim milk sold at retail varied considerably during the period.

Distribution by city

The distribution of milk sales among the three cities comprising the marketing area corresponded rather closely to the distribution of the population according to the 1950 Census (table 5). Sales in Duluth were more than 73 percent of total sales in the market in all 4 months of the study, although the population of Duluth in the 1950 Census was not quite 71 percent of the total population in the marketing area. In Cloquet the percentage of sales also exceeded the percentage of the population. In Superior, of course, the reverse was true.

These slight differences, however, do not necessarily indicate different rates of per capita consumption of fluid milk among the cities. Per capita figures would be influenced by several factors. The population pattern may have been somewhat different in the months under review than it was on the Census date. Handlers' wholesale and retail routes may have crossed city lines to a greater degree than was reported. Handlers in Duluth and Cloquet may have had a larger proportion of sales outside the limits of the marketing area than handlers in Superior. Residents of one city may regularly purchase milk in one of the other cities; this could be especially true of milk sold in restaurants. The influx of transients may be appreciable and may be unevenly distributed among the three cities.

Selling Prices

Selling prices were obtained from handlers' published price lists, details of which are presented in Appendix table 13. From these, weighted average prices were computed for items to which price ranges or discount

Table 5.--Percentage of total fluid milk sold and percentage of population, by cities in the Duluth-Superior marketing area

Month and year	Fluid milk sales		
	Entire marketing area	Duluth	Superior and Cloquet 1/
	1,000 quarts	Percent	Percent
May 1947	2,156	73.5	26.5
November 1947	2,070	74.0	26.0
May 1948	2,111	73.4	26.6
November 1948	2,106	73.5	26.5
	Population		
	Number	Percent	Percent
April 1950 2/	147,521	70.8	29.2

1/ Data for these two cities were combined in this table to avoid revealing information about individual handlers.
2/ 1950 Census.

plans applied, and for groups of items. In addition to the discount plans affecting the price of milk delivered to homes, volume reductions applied to bulk milk at wholesale, and unlisted discounts were granted on volume sales to schools and to some other buyers. (See p. 17.)

The weighted average selling price for all milk sold in the market and weighted average prices for the various types of milk and for retail and wholesale are shown in table 6, together with average prices for the most important individual items. This table also shows the percentage that each item is of total fluid sales, indicating the relative importance of the various items entering into the weighted average prices.

Retail prices

Average prices on quarts of standard milk delivered to homes were computed from list prices for Duluth and Superior according to the pricing plan effective in each city, on the basis of the distribution of home deliveries by size of monthly delivery as determined from the route sample described on pages 7 to 9. According to this distribution 83.7 percent of the milk would be sold at the higher price in Duluth; in Superior only 35.3 percent would be sold at the higher price. 15/ (See pp. 34-38.) The

15/ It may be questioned whether the 35.3 percent figure for Superior is as suitable for use in May 1947 as in the other months, because the differential between the price for single quarts and the price for multiple purchases was only 2 cents in that month. One might expect that a smaller
(Continued on page 17)

243706 O—53——3

Table 6.--Selling prices: Weighted average price per quart of fluid milk, by type of milk and channel of sale and for largest selling items, and percentage that each item is of total fluid sales, Duluth-Superior marketing area, May and November, 1947 and 1948

Item	May 1947		November 1947		May 1948		November 1948	
	Selling price per qt.	Percentage of fluid sales	Selling price per qt.	Percentage of fluid sales	Selling price per qt.	Percentage of fluid sales	Selling price per qt.	Percentage of fluid sales
	Cents	Percent	Cents	Percent	Cents	Percent	Cents	Percent
All fluid milk, retail and wholesale	13.48	100.00	15.88	100.00	16.82	100.00	17.90	100.00
Type of milk:								
Standard	13.46	98.04	15.86	97.95	16.81	97.74	17.88	98.24
Golden Guernsey	16.20	.83	18.76	.76	19.56	.71	20.63	.63
Flavored	14.11	1.01	16.19	1.17	16.90	1.38	18.43	.98
Skim	4.64	.12	9.38	.13	9.64	.17	11.12	.15
Channel of sale:								
Retail	15.20	31.93	17.66	30.90	18.65	30.83	19.75	29.60
Wholesale	12.68	68.07	15.08	69.10	16.00	69.17	17.12	70.40
Largest selling items:								
Retail, delivered to homes:								
Standard, quarts	15.15	30.83	17.61	29.91	18.61	29.72	19.72	28.69
Wholesale								
Standard								
Bulk	12.00	5.97	14.00	5.67	15.00	5.41	16.00	5.49
Quarts	12.49	55.26	14.98	56.47	15.98	56.38	17.00	57.62
Pints and half pints	15.18	5.85	17.17	5.82	17.17	6.08	19.16	6.32
Flavored								
Quarts	12.45	.39	14.95	.44	15.96	.54	17.00	.37
Pints and half pints	15.14	.32	17.14	.36	17.14	.38	19.13	.37
All other retail and wholesale	15.07	1.38	17.43	1.33	17.98	1.49	19.28	1.14

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multiple-unit pricing plan had apparently not been inaugurated in Cloquet during the period of this study, and list prices were used to compute averages. Weighted averages were computed for the market as a whole on the basis of the volumes sold in each of the three cities.

Prices of all other retail items are included in table 6 under the caption "all other retail and wholesale." Price information on flavored milk was incomplete, but the best available data indicated that flavored milk sold at retail in quart containers was subject to the same prices and discount plans applicable to standard milk, and averages were computed on that assumption.

Other retail items included in the weighted average of all retail milk are standard and flavored milk sold in pint and half pint containers, and Golden Guernsey and skim milk sold in quart containers. List prices were used for all these items; the mid-point of the range was used as the price for Golden Guernsey in May and November, 1947. Prices for retail sales of standard milk in bulk were estimated.

Wholesale prices

Standard, flavored, skim, and Golden Guernsey milk sold in quart and pint containers was assumed to have been sold at list prices. It is known that some discounts were granted to wholesale buyers of bottled milk, but information as to the size of the discounts or the extent to which they were granted was not available for this study. The list price for flavored milk in Cloquet was considered to be the same as the price for standard milk. For purposes of computing the weighted average of all wholesale and all retail items, and for all milk, standard milk sold in quarts through one handler's retail stores was treated as wholesale. Schedule prices for single quart sales at the handler's stores were used for November 1947 and May and November 1948. For May 1947 the handler's list provided for a reduced price for the purchase of 2 quarts; it was assumed that 90 percent of all sales were made at the lower price. For sales of standard milk in bulk the price pertaining to 3 or more gallons was used because most sales in bulk are known to be made in containers holding more than 2 gallons, but satisfactory information was not available to show the quantities sold in small lots. The price of skim milk sold in bulk in May 1947 was estimated. Flavored milk sold in bulk was priced the same as bulk standard milk.

It was estimated that 20 percent of total sales of standard and flavored milk in half pint containers went to hotels and restaurants and

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Footnote 15 continued:
discount would offer consumers less incentive to purchase milk under the discount plan. However, the fact that the experience on routes in Duluth, where there was only a 1-cent differential, fitted in with actual average prices received by one handler in Superior indicates that the amount of the differential probably had only a minor effect on the percentage of milk sold at discount.

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80 percent to schools. The list price was used for the estimated sales to hotels and restaurants, but sales to schools were estimated to average 1/4 cent less.

Changes in selling prices

The weighted average selling price of all milk sold in the market (table 6) showed a decided upward tendency during the months studied, climbing from 13.48 cents per quart in May 1947 to 17.90 cents in November 1948, an increase of about 33 percent. During the same period the average retail price increased 30 percent from 15.20 cents to 19.75 cents per quart, whereas the average wholesale price rose 35 percent from 12.68 cents to 17.12 cents. The absolute increase (in cents per quart) was almost identical for the wholesale and retail prices; the lower average price of wholesale milk caused the percentage increase to be greater. The effect of the over-all price increases on the weighted average price of all milk was modified by the fact that the proportion of wholesale sales was increasing during the period studied.

The increases in average prices, of course, reflect the changes in the announced selling prices (Appendix table 13). In May 1947 prices were reduced 1 cent per quart for most items from the level prevailing during the first 4 months of 1947; in August prices returned to the higher level of the first 4 months; in September prices of most items were again increased 1 cent, and in October another increase was announced, this time 1/2 cent. 16/ The resulting price level was maintained for the remaining 3 months of 1947. The frequent changes in selling prices during 1947 were occasioned by the wide fluctuation of Class I prices during the year. The year 1948 began with prices 1 cent higher than those prevailing in December 1947, and no change took place until September, when a 1-cent increase was made effective. This relative stability reflected the firmness of Class I prices, which held until November.

By using as bench marks the weighted average prices for all milk in May and November of the 2 years, it was estimated that the average selling price for the entire year 1947 was about 14.7 cents per quart, whereas the average for 1948 was 17.2 cents. (See fig. 4 and Appendix table 14.)

Changes in the prices of some items differed from the general changes. For example, prices of milk sold in pints and half pints did not always change at the same rate per quart as the retail and wholesale prices for milk in quart containers. This was chiefly because handlers wished to round prices to manageable figures. Changes in the price of skim milk and of milk sold at a handler's retail stores, however, were intended to change price relationships.

16/ Two changes occurred in the discount structure in Superior during 1947. In May and November the changes in the single quart price and the price for quantity purchases were not the same as the general price changes in the market. However, the amount of the general change did apply to the midpoint of the range in Superior.

Weighted averages of selling prices, costs, and margins on all fluid milk sold in the Duluth-Superior marketing area, 1947 and 1948. (Data for months other than May and November of both years were estimated so as to reflect the same basis as data for the selected months.)

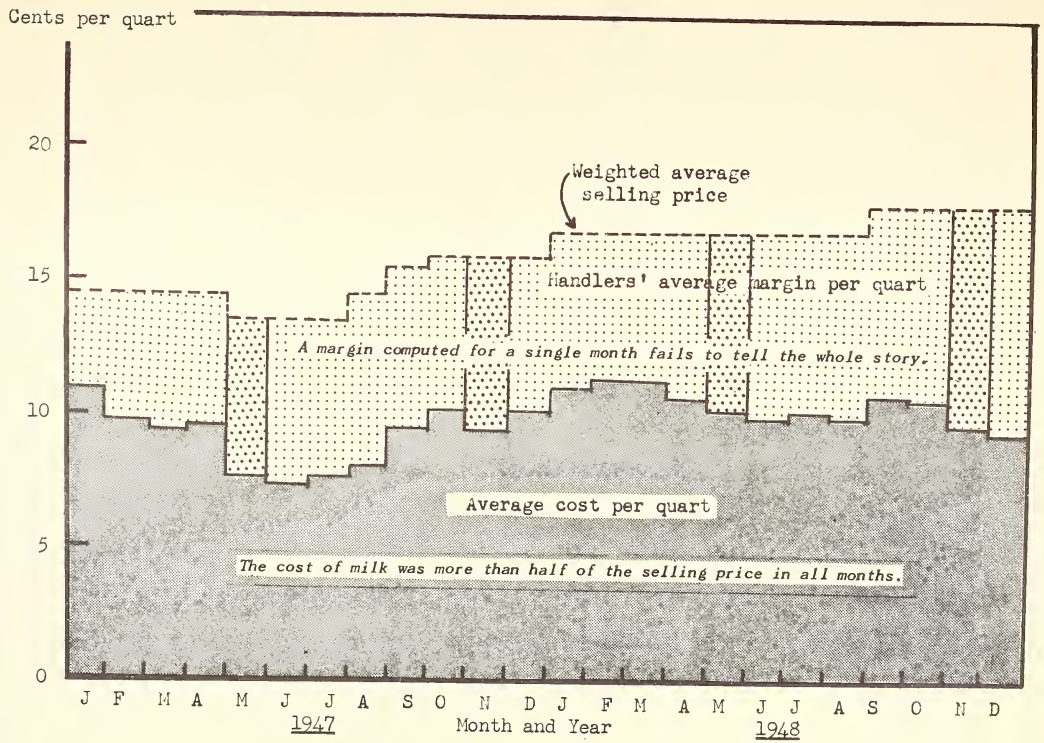
Cents per quart
20
15
10
5
0
Weighted average selling price
Handlers' average margin per quart
A margin computed for a single month fails to tell the whole story.
Average cost per quart
The cost of milk was more than half of the selling price in all months.
J F M A M J J A S O N D J F M A M J J A S O N D
1947
Month and Year
1948

Figure 4.--The amount of money available to handlers for processing, packaging, and delivery of milk fluctuated from month to month but tended to increase during the 2-year period.

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Cost of Milk

Method of determining product cost

The minimum Class I price established by the order (Appendix table 15) was used as the basic price for determining the cost of fluid milk sold by handlers. Handlers may, of course, pay more than this price, and in actual practice do so at times if they are anxious to maintain a certain supply, or if they particularly want the milk from a specific producer. Any amount paid in excess of the minimum price is referred to as a premium. In Duluth the following kinds of premiums were paid in the months under review:

Most handlers paid new producers the uniform price payable to regular producers. 17/

Marketing service fees were paid for their producers by some handlers.

In one or two cases a handler paid the tax on transportation charges for his producers.

None of these premiums was paid for any particular type or grade of milk. For that reason they were considered to be general premiums and applicable to all milk received from producers.

Premiums paid on Golden Guernsey milk were relatively unimportant. The rate of premiums paid was computed on the basis of sales of Golden Guernsey milk only, and was added to the minimum price to compute the cost of Golden Guernsey.

Administration fees paid to the market administrator by handlers are considered to be a product cost since the fee is established by the same regulation as the price and applies to all milk subject to the pricing provisions of the order.

Although shrinkage in excess of 2 percent of all milk was charged to handlers at the Class I price, it was not considered to be a cost of fluid milk. The cost of shrinkage, whether charged at the Class III or the Class I price, has been regarded as an operating cost rather than a product cost, since it represents a loss incurred in processing.

Summarized in table 7 for the 4 months under review are the various factors comprising the cost of milk having a butterfat content of 4.0 percent. The receipts of milk used in computing the per hundredweight rate of premiums paid were the total quantities received from producers by handlers, and used by the market administrator in determining blended prices.

17/ The order required that not more than the Class III price need be paid to a new producer during his first three delivery periods on the market.

The butterfat differentials applicable in each month are shown in order to provide a basis for adjusting the price to apply to the actual butterfat content of the various items sold.

Table 7.--Computation of handlers' cost per hundredweight of 4.0 percent milk sold as Class I

Item	May 1947	November 1947	May 1948	November 1948
	Dollars	Dollars	Dollars	Dollars
Minimum Class I price for 4.0% milk, as announced by market administrator	3.913	4.753	5.217	4.851
Premiums paid by handlers*	.011	.030	.008	.024
Administration assessment	.020	.020	.020	.030
Total cost for 4.0% Class I milk per hundredweight	3.944	4.803	5.245	4.905
Butterfat differential, per 1/10 of 1% butterfat	.078	.088	.103	.081
*Rate of premiums computed from:				
Total premiums paid, dollars	1,024	1,329	723	1,259
Total receipts from producers, thousand pounds	9,089	4,396	8,654	5,300

In order to illustrate the method used to determine the cost of milk, the calculation of the average price of all fluid milk for the month of May 1947 is shown in Appendix B (p. 54).

Unit and composite cost related to butterfat content

The butterfat content of the various types of milk sold at wholesale and retail in various sizes of containers are presented in table 16 in the appendix, and the corresponding costs are shown in table 17. The weighted average butterfat content of each item was computed from the sums of the quantities of milk and butterfat for all items reported by the selling handlers.

Table 8 presents weighted average percentages of butterfat content and costs for the same items and groups of items for which selling prices are shown in table 6. The butterfat content of all fluid milk sold in the marketing area averaged very close to 3.5 percent in 3 of the months studied,

Table 8.--Butterfat content and cost of milk: Weighted average percentage of butterfat and cost per quart of fluid milk, by type of milk and channel of sale and for largest selling items, Duluth-Superior marketing area, May and November, 1947 and 1948 1/

Item	May 1947		November 1947		May 1948		November 1948	
	Butter-fat test	Milk cost per quart	Butter-fat test	Milk cost per quart	Butter-fat test	Milk cost per quart	Butter-fat test	Milk cost per quart
	Percent	Cents	Percent	Cents	Percent	Cents	Percent	Cents
All fluid milk, retail and wholesale	3.503	7.65	3.547	9.47	3.502	10.17	3.498	9.67
Type of milk:								
Standard	3.520	7.68	3.567	9.51	3.528	10.23	3.516	9.70
Golden Guernsey	4.720	9.69	4.385	11.06	4.332	12.22	4.348	11.25
Flavored 2/	1.346	4.03	1.764	6.10	1.642	6.05	1.710	6.56
Skim	0	1.77	0	2.76	0	2.42	0	3.58
Channel of sale:								
Retail	3.551	7.73	3.592	9.55	3.536	10.25	3.543	9.75
Wholesale	3.481	7.61	3.527	9.43	3.487	10.14	3.479	9.64
Largest selling items:								
Retail, delivered to homes								
Standard, quarts	3.546	7.72	3.592	9.55	3.544	10.27	3.545	9.75
Wholesale								
Standard								
Bulk	3.499	7.64	3.539	9.45	3.515	10.20	3.503	9.68
Quarts	3.510	7.66	3.554	9.48	3.521	10.22	3.501	9.68
Pints and half pints	3.489	7.62	3.580	9.53	3.537	10.25	3.528	9.72
Flavored 2/								
Quarts	1.371	4.07	1.835	6.23	1.739	6.27	1.633	6.42
Pints and half pints	1.298	3.95	1.669	5.92	1.449	5.63	1.788	6.69
All other retail and wholesale	3.459	7.57	3.210	8.83	2.952	9.06	3.118	9.06

1/ Milk cost is based on the Class I price adjusted for butterfat content of milk sold, and reflects premiums and administration fees paid by handlers.

2/ Cost of flavoring material not included in cost.

but in November 1947 it was slightly higher, averaging 3.55 percent. The average cost of all milk varied from a low of 7.65 cents per quart in May 1947 to a high of 10.17 cents in May 1948. In November 1948 it was 9.67 cents, slightly higher than the cost in November 1947 of 9.47 cents. Since standard milk represented such a large percentage of all milk, its average butterfat content and cost fluctuated in the same general way. The costs of flavored milk and skim milk, however, were highest in November 1948. The cost of flavored milk was affected in part by fluctuations in the butterfat content, but costs of both flavored and skim milk were more strongly influenced by the changes in the butterfat differential.

The average butterfat content and cost of milk sold at retail were slightly higher than for milk sold at wholesale. Partly responsible for this difference is the fact that wholesale sales included a larger proportion of skim and flavored milk whereas retail milk included a larger portion of high-fat Golden Guernsey milk. Another important factor, however, is that the weighted average butterfat content of milk sold by handlers with wholesale routes was slightly lower than that of milk sold by handlers having proportionately greater retail sales. Each handler reported only one butterfat test for each type of milk sold; that is, no handler reported a butterfat test of milk sold at wholesale which differed from the test of milk sold at retail.

Assuming an average butterfat content of 3.5 percent, and average premium and administration costs of 4.1 cents per hundredweight, it was estimated from the Class I prices and butterfat differentials shown in table 15 that the average cost of all milk sold in 1947 would have been $4.252 per hundredweight, and in 1948 $4.834, or 9.2 and 10.4 cents per quart, respectively. (See fig. 4 and Appendix tables 14 and 15.)

MARGINS

Composite Margins on Fluid Milk

Important changes occurred during 1947 and 1948 in the portion of the sales dollar available to handlers in the Duluth-Superior marketing area for processing, packaging, and delivering fluid milk to consumers' homes, to stores, and to other users.

The weighted average or composite margin increased moderately from 5.83 cents per quart in May 1947 to 6.65 cents in May 1948, but rose sharply to 8.23 cents in November 1948 (table 9). In May 1947, the margin represented 43.2 percent of the average selling price, but in May 1948 it was only 39.5 percent. In November 1948, however, the margin rose to 46.0 percent of the average price.

In May 1947 the cost of milk, as reflected by the Class I price (Appendix table 15) 18/, had reached a low level, and after fluctuating

18/ The Class I price for milk of the basic butterfat test (4.0 percent) is used here for comparison with the selling price rather than a cost

(Continued on page 25)

243706 O—53— —4

Table 9.--Margins: Weighted average margin per quart of fluid milk and percentage of selling price, by type of milk and channel of sale and for largest selling items, Duluth-Superior marketing area, May and November, 1947 and 1948

Item	May 1947		November 1947		May 1948		November 1948	
	Margin per qt.	Percentage of selling price	Margin per qt.	Percentage of selling price	Margin per qt.	Percentage of selling price	Margin per qt.	Percentage of selling price
	Cents	Percent	Cents	Percent	Cents	Percent	Cents	Percent
All fluid milk, retail and wholesale	5.83	43.2	6.41	40.4	6.65	39.5	8.23	46.0
Type of milk:								
Standard	5.78	42.9	6.35	40.0	6.58	39.1	8.18	45.7
Golden Guernsey	6.51	40.2	7.70	41.0	7.34	37.5	9.38	45.5
Flavored	10.08	71.4	10.09	62.3	10.85	64.2	11.87	64.4
Skim	2.87	61.9	6.62	70.6	7.22	74.9	7.54	67.8
Channel of sale:								
Retail	7.47	49.1	8.11	45.9	8.40	45.0	10.00	50.6
Wholesale	5.07	40.0	5.65	37.5	5.86	36.6	7.48	43.7
Largest selling items:								
Retail, delivered to homes								
Standard, quarts	7.43	49.0	8.06	45.8	8.34	44.8	9.97	50.5
Wholesale								
Standard								
Bulk	4.36	36.3	4.55	32.5	4.80	32.0	6.32	39.5
Quarts	4.83	38.7	5.50	36.7	5.76	36.0	7.32	43.1
Pints and half pints	7.56	49.8	7.64	44.5	6.92	40.3	9.44	49.3
Flavored								
Quarts	8.38	67.3	8.72	58.3	9.69	60.7	10.58	62.2
Pints and half pints	11.19	73.9	11.22	65.5	11.51	67.2	12.44	65.0
All other, retail and wholesale	7.50	49.8	8.60	49.3	8.92	49.6	10.22	53.0

seasonally during the summer it reached a high point in October, when it was more than 2 1/2 cents per quart higher than in May. In November 1947, however, it dropped nearly 1 cent per quart, but rose again by a slightly larger amount in December. Selling prices were also at a low level in May 1947, and prices of most items increased more or less in line with cost increases. No reduction, however, accompanied the temporary drop which occurred in Class I prices in November 1947, so that selling prices were 2 1/2 cents higher in November than they were in May.

During the first 3 months of 1948 the Class I price reached the highest level of the 2-year period, with the cost per quart of milk nearly 4 cents higher than it was in May 1947. By May 1948, however, the Class I price had declined 1 cent per quart, but after a small further decline in June, it began to climb again, and by October it was slightly higher than in May 1948. In November 1948, as in November 1947, an abrupt contraseasonal drop of about 1 cent per quart occurred, but this time no recovery took place in December. An increase of 1 cent per quart in selling prices accompanied the cost increase that occurred in January 1948, but no reduction was made in selling prices when Class I prices weakened seasonally in the spring. In September 1948, an increase of 6/10 cent in the Class I price was accompanied by an increase of a full cent in selling prices, doubtless in expectation of a continued rise in the buying price. In November, however, the sizable drop in the Class I price was not immediately reflected in a modification of the selling prices, thus causing the high margin shown for that month.

Based on the estimated average of the selling prices for the entire years of 1947 and 1948 and the estimated average costs, the annual average margins were 5.5 cents per quart for 1947 and 6.8 cents for 1948. (See fig. 4 and Appendix table 14.) These margins represented 37.4 percent of the selling price in 1947 and 39.5 percent in 1948.

Margins fluctuated appreciably from month to month, ranging from a low of 3.5 cents per quart in January 1947 to a high of 8.5 cents in December 1948. Such fluctuations occurred because, although the cost of milk changed almost monthly, changes in selling prices were made at less frequent intervals. Moreover, some changes in selling prices were made in anticipation of normal seasonal fluctuations in cost. When the normal pattern of cost failed to materialize, margins also failed to follow the expected patterns.

Footnote 18 continued:
adjusted for the butterfat content of the milk sold. It is felt that handlers most often consider only the change in the Class I price in determining the change to be made in selling prices. That is, when the basic Class I price has changed by 20 to 25 cents per hundredweight (either in a single change or a total of several changes), a change of 1/2 cent per quart is made in selling prices. Changes in the cost resulting from the application of the butterfat differential are taken into consideration at less frequent intervals.

Average Margins by Type of Milk and Channel of Sale

Margins on standard milk, representing so large a percentage of total fluid sales, necessarily coincided in level and pattern of change with margins on all milk (table 9). In some months these margins, expressed in cents per quart, were the lowest of all the margins, but in other months the lowest margins were on skim milk.

The fact that margins on standard milk were low in relation to most other items in all months may be related to the fact that standard milk is the largest selling type. The low margins on skim milk, however, are due to other factors. The most important one is that the weighted average price of skim milk was low because it was heavily weighted (by about 80 percent) by the price of wholesale sales in bulk containers. Also, the price of skim milk was unusually low in May 1947 in relation to the price of standard milk. 19/ It is surprising, then, that with the low average selling prices of skim milk, margins on this item should at any time have been higher than margins on standard milk. The explanation lies in the fact that the butterfat differential is a much more important factor in deriving the cost of skim milk than in computing the cost of standard milk, and changes in the cost of skim milk were at times more strongly influenced by the butterfat differential than by the Class I price itself. Thus, in the months when the butterfat differential was high in relation to the Class I price, the computed cost of skim milk was relatively low. This is what happened in the 2 months (November 1947 and May 1948) when the margin on skim milk was higher than that on standard milk. But in November 1948 the differential was low in relation to the Class I price, and the cost of skim milk was higher for that month than for May 1948 when the Class I price was at the highest for the 4 months. This can clearly be seen from the following computation of the net cost of skim milk (not including adjustment for premiums and assessments) for May 1948:

Class I price, per hundredweight	$5.217
Adjustments for 40 points butterfat	4.120
Net cost of skim milk, per hundredweight	$1.097

as compared with the computation for November 1948:

Class I price, per hundredweight	$4.851
Adjustments for 40 points butterfat	3.240
Net cost of skim milk, per hundredweight	$1.611

It will be seen from the above that in November the Class I price was $0.366 lower and the net cost of skim milk was $0.514 higher than in May.

19/ In September 1947 the price of skim milk was increased 5 cents per quart, but prices of standard milk were increased only 1 cent per quart.

Owing to the same factor, the cost of skim milk in November 1948 was more than double the cost in May 1947, although the Class I price was only one-fourth higher.

Changes in the butterfat differential, of course, also influenced the cost of standard milk, though to a lesser extent, in adjusting from the basic 4 percent price to reflect about 3.5 percent butterfat content of milk sold. For example, the cost per quart of standard milk dropped only about 1/2 cent between May and November 1948, whereas the Class I price dropped 3/4 cent.

Flavored milk was priced to return the highest margins to handlers. This is not surprising, as flavored milk was sold in relatively small volume and the margin had to cover not only the processing cost, but also the cost of the flavoring materials used.

The average margins on flavored milk fluctuated less than those for any other type of milk. In part this arose from the fact that the average selling price did not follow the general price changes as closely as prices for standard milk (even though it was sold at the same price), because there were offsetting changes in the quantities sold in the various sizes of containers and in the proportions sold in the three cities. More important, however, was the influence of the variations in the butterfat content of the milk and the effect on the cost of fluctuations in the butterfat differential, and the importance of the differential in determining the cost of a low fat product.

Next to the highest weighted average margins were those on all sales of Golden Guernsey milk, chiefly as a result of the high percentage of Golden Guernsey which was sold at retail. This is in contrast to the comparatively low margins on individual items of Golden Guernsey milk. (See p.29.) Golden Guernsey margins, too, were strongly influenced by the changes in the butterfat differential, although in the opposite direction from skim milk, but the effects were modified by reductions in the butterfat content. As the price of Golden Guernsey milk was higher than that of any other type of milk, price increases were less in terms of percentages of selling price. At the same time, increasing butterfat differentials during late 1947 and early 1948 caused the cost of the product to rise relatively more than that of any other type of milk. Apparently this combination of circumstances made it unprofitable to maintain through the 2 years the high butterfat content contained in Golden Guernsey milk in May 1947.

Weighted average margins on milk sold at wholesale were about 2.5 cents per quart lower than weighted average retail margins in all 4 months of the study.

Unit Margins

Differences among container sizes

The highest margins per quart for milk in different sizes of containers were on the small container sizes, both at retail and wholesale

(Appendix table 18). Although the cost of the packages per quart of milk sold in pints is lower than that of milk sold in half pints, this factor was offset by the savings gained from the handling of a larger volume of milk in half pints, especially on milk sold to schools.

Flavored milk sold at wholesale in half pints, strongly influenced by sales to schools, had an average butterfat content, and consequent cost, markedly higher than such milk sold in pints (Appendix table 16). This was the factor most responsible for the relatively low margins on flavored milk in half pints sold to schools.

Differences among retail items

The lowest margin per quart for milk sold at retail was for the second and additional quarts per stop in Superior under the discount plan. Although no individual customer purchased all his milk at the price from which this margin was computed, the price was that for which handlers sold about two-thirds of the milk sold at retail. This low margin contributed to the fact that average margins on quarts of standard milk delivered to consumers' homes were more than 1/2 cent less in Superior than in Duluth. The weighted average selling price in Duluth was from 6/10 to 3/4 cent higher than in Superior in all months of the study. This difference was not wholly reflected in the margins, however, since the butterfat content, and consequently the cost of milk, was slightly lower for Superior than for Duluth.

In Superior, the differential between the retail price for the first quart and additional quarts delivered to homes changed twice during 1947. From January through April the differential was 1 cent; in May it became 2 cents, and it remained at that figure until November, when it became 3 cents. During the entire 2 years, however, the simple average of the two prices in Superior was the same as the simple average of the two prices in Duluth. When a change was made in the differential simultaneously with a general price increase or decrease, the price change applied to the simple average of the two prices even though both prices did not change by the same amount.

These facts seem to indicate that handlers, both in Superior and in Duluth, assumed the simple average of the two prices to represent an average price received. However, it is interesting to observe that in November 1947 the average butterfat content of milk sold at retail in Superior was slightly lower than it was in May 1947, although in Duluth it was higher in November than in May. It is quite possible that these changes were accidental. Nevertheless, there may be some significance in the fact that the average margin shown for quarts of standard milk sold at retail in Superior increased from May to November 1947 by exactly the same amount as the average margin for Duluth; for although the average selling price increased slightly more in Duluth than in Superior, the average cost also increased slightly more, owing to changes in butterfat content, and this difference exactly offset the difference in the increase of the average price.

Average margins on standard milk in quarts sold at retail in Cloquet were lower in the first 3 months of the study than the average margins for either of the other two cities. This was chiefly due to the fact that retail prices in Cloquet were somewhat lower during these months than prices in Duluth and Superior. In addition slightly higher butterfat content of milk sold in Cloquet contributed to a higher cost and thus to a lower margin.

In only 1 month, November 1947, were retail margins on Golden Guernsey milk as high as the market average margin on standard milk sold in quarts. The high cost of Golden Guernsey milk as compared with standard milk and the lack of a corresponding price differential were, of course, responsible for the low margins. The relatively high cost persisted even in the months during which the butterfat content had been lowered.

Differences among wholesale items

Among the wholesale margins, those on standard milk sold in bulk were generally the lowest. Exceptions occurred in May 1947 and November 1948. In May 1947 standard milk sold in quart containers in Cloquet carried a lower margin, and Golden Guernsey margins were also lower. Weighted average margins on all skim milk and margins on skim milk sold in bulk containers were lower (than those of standard milk sold in bulk) both in May 1947 and in November 1948.

Golden Guernsey milk returned the lowest margins of any milk sold at wholesale in quart containers in all months except May 1947, when the margin on standard milk sold in quarts in Cloquet was unusually low.

Ranges in margins

Ranges of margins based on ranges in costs are shown for standard milk and flavored milk at wholesale and retail in all container sizes, based on weighted average prices (Appendix table 18). The difference between the high and low of the margins on standard milk, both at wholesale and retail, were appreciably larger in the 2 months of 1948 than of 1947. This widening of the range resulted both from a widening in the range of the butterfat content and changed relationships between the butterfat differential and the Class I price (Appendix table 16). Ranges in the margins on flavored milk were much wider than those on standard milk, as a result of the greater variations in the butterfat content of flavored milk and milk drinks.

Simple Price Spreads

Simple price spreads, as commonly computed from published data, were calculated to provide a comparison with the weighted average margins derived from handlers' records. These price spreads are the differences between the prices of quarts of standard milk sold at wholesale and retail as announced by handlers 20/, and the Class I prices per quart of 4 percent

20/ The simple average of the single-unit and the multiple-unit prices were used where a multiple-unit discount plan applied.

milk, as established by the market administrator.

When these simple price spreads were compared with the weighted average margins, as in table 10, they were found to be from 0.2 cent to 1.3 cents lower for individual items, and some of the advantages of the weighted average margins over the simple spreads become apparent:

1. The weighted average margins reflect differences in cost due to differences between the butterfat content of milk sold and the basic butterfat test for which the Class I price is established.

   The simple price spreads, based on the price of milk containing 4 percent butterfat, failed to reflect actual product cost. In the Duluth-Superior market this failure results in an overstatement of costs and consequent understatement of price spreads.

2. Weighted average margins indicate variations in the butterfat content of milk sold, reflecting changes from month to month, as well as differences in the butterfat content among specific items.

   Simple price spreads, on the other hand, reflect changes in the Class I price alone, and provide no means of measuring differences in butterfat content among items.

   Thus, when the retail price in Cloquet was the same as the price for the first quart in Duluth (November 1948), the simple price spreads were alike for both items, but the weighted average margins differed by 0.4 cent.

3. Changes in cost arising from changes in the relationship of the butterfat differential to the Class I price are reflected in the weighted average margins.

   Simple price spreads, however, fail to relate changes in the butterfat differential to the Class I price. This is most clearly demonstrated in a comparison of data for November 1947 and May 1948, when the Class I price and selling prices both increased by about 1 cent per quart so that the simple spreads remained the same. The weighted average margins, on the other hand, were increased about 0.3 cent in the latter month as a result of an increase in the butterfat differential which was proportionately greater than the increase in the Class I price.

4. Where a multiple-unit pricing plan is in operation, the weighted average margin provides the handler with a satisfactory means of determining the average return on fluid milk sold at retail under the plan in the market.

Table 10.--Simple price spreads, weighted average margins, and differences between the two, per quart of standard milk sold in quart containers at retail and wholesale and of all fluid milk, May and November, 1947 and 1948

Item	Simple price spread 1/				Weighted average margin 2/				Difference 3/			
	May 1947	Nov. 1947	May 1948	Nov. 1948	May 1947	Nov. 1947	May 1948	Nov. 1948	May 1947	Nov. 1947	May 1948	Nov. 1948
	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents
Retail, delivered to homes:												
Duluth												
1-2 quarts	7.1	7.8	7.8	9.6	7.8	8.4	8.7	10.3	0.7	0.6	0.9	0.7
3 or more	6.1	6.8	6.8	8.6	6.8	7.4	7.7	9.3	.7	.6	.9	.7
Average sale	4/ 6.6	4/7.3	4/7.3	4/9.1	7.6	8.3	8.6	10.1	1.0	1.0	1.3	1.0
Superior												
First quart per stop	7.6	8.8	8.8	10.6	8.3	9.6	9.8	11.3	.7	.8	1.0	.7
All over 1 per stop	5.6	5.8	5.8	7.6	6.3	6.6	6.8	8.3	.7	.8	1.0	.7
Average sale	4/ 6.6	4/7.3	4/7.3	4/9.1	7.0	7.7	7.9	9.4	.4	.4	.6	.3
Cloquet	6.1	6.8	6.8	9.6	6.7	7.2	7.5	9.9	.6	.4	.7	.3
Average of 3 cities	5/ 6.4	5/7.1	5/7.1	5/9.3	7.4	8.1	8.3	10.0	1.0	1.0	1.2	.7
Wholesale	6/ 4.1	6/4.8	6/4.8	6/6.6	7/4.8	7/5.5	7/5.8	7/7.3	.7	.7	1.0	.7
All fluid milk, retail and wholesale	8/ 5.3	8/6.0	8/6.0	8/8.0	5.8	6.4	6.7	8.2	.5	.4	.7	.2

1/ Difference between announced retail price and the Class I price for 4.0 percent milk. (See Appendix tables 13 and 19.)
2/ From data in Appendix table 18.
3/ Amount by which weighted average exceeds simple price spread.
4/ Simple average.
5/ Using "average sale" for Duluth and Superior and single margin for Cloquet.
6/ Duluth and Superior.
7/ Entire market.
8/ Simple average of wholesale spread and "average of three cities" at retail.

The simple price spread, based on an arbitrary average of such prices, is much less likely to reflect the actual return. Thus, the simple price spreads for an average sale were alike for Duluth and Superior, but the weighted average margins, based on computed average selling prices which reflect the different applications of the two plans, differed greatly.

5. A weighted average margin on all fluid milk sold (the composite margin) provides the handler with a fairly accurate indication as to what portion of the total sales dollar is available to handlers, on the average, for processing, packaging, delivery, and other costs.

The simple price spreads do not readily lend themselves to the computation of a suitable average on all milk. For each of the 4 months the composite weighted average margins exceeded the average of the simple price spreads by a sizable amount, but the weighted average margins exceeded the simple spreads on most individual items by even larger amounts. In the simple price spreads, equal weighting of wholesale and retail prices resulted in an upward bias, but this was more than offset by the understatement that resulted from basing the simple spread on a cost of 4 percent milk.

The simple price spread most commonly computed is that based on the retail price of milk delivered to homes and the Class I price at the basic butterfat test. In this market, with its multiple-unit pricing plan, the spread would most logically be based on a price assumed to represent the average price received for milk sold at retail. As has been pointed out, (p. 28) the simple average of the price for the minimum purchase and the price for multiple purchases was the same for Duluth and Superior and was apparently accepted by handlers as representing an average price received in both cities.

Price spreads on this basis were computed by months for the entire 2-year period of 1947 and 1948 and are shown in Appendix table 19. In figure 5 these spreads are plotted for comparison with the composite weighted average margins estimated for the entire 2 years. (Also see Appendix table 14.)

The simple price spreads on retail milk averaged 0.7 cent above the weighted average margins in each of the 2 years, but differences in the individual months ranged from 0.5 cent in January 1947, to 0.9 cent in November 1948. The factor chiefly responsible for these differences is the failure of the simple spreads based on retail prices to take into account the large proportion of milk sold at wholesale in the Duluth-Superior market. It is obvious, therefore, that the use of the simple spread computed from the retail price is misleading as an indication of the handler's return, even when it is closest to the weighted average margin.

Simple average price spreads on milk sold at retail in Duluth or Superior as compared with weighted average margins on all milk sold at retail and wholesale in the Duluth-Superior marketing area, 1947 and 1948

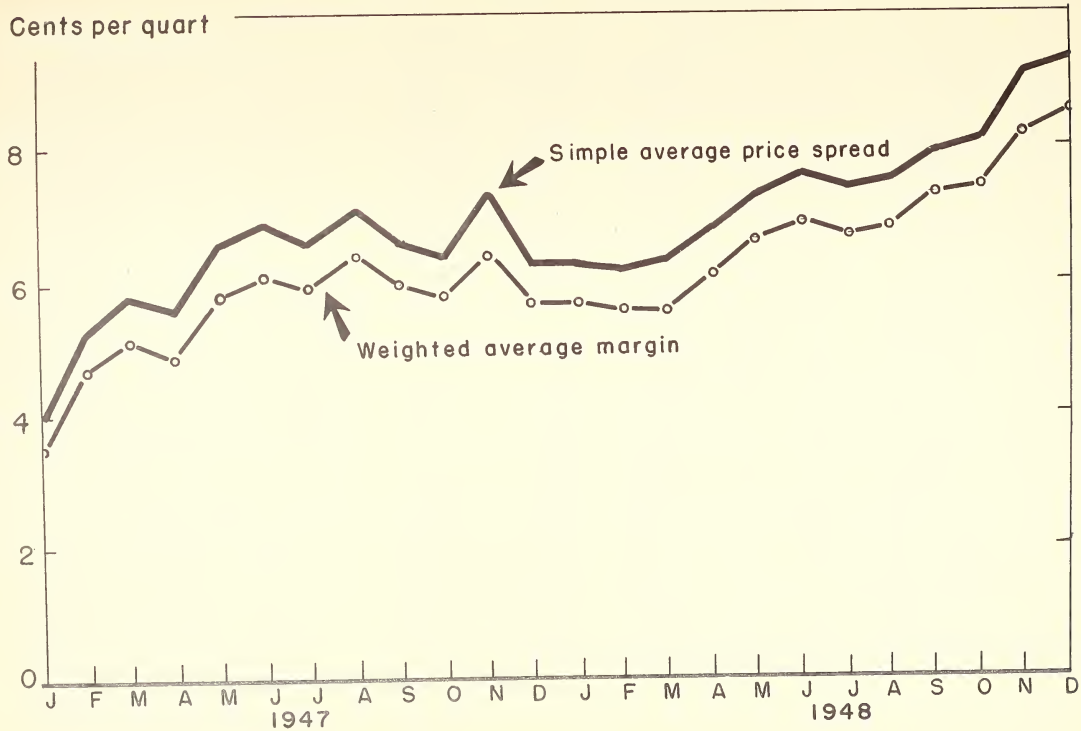

Figure 5.--Simple average price spreads exceeded average margins during the entire 2-year period. The decided upward tendency of both reflected the increase in selling prices. (See p. 29 for description of simple average price spread.)

AVERAGE PRICE UNDER MULTIPLE-UNIT PRICING PLANS

The data described on pages 7 to 9 for four retail routes in Duluth were used as the basis for computing average selling prices for both Duluth and Superior under the two discount plans. The selected routes were considered representative of the market because:

1. The average daily purchase per customer on the selected routes (1.35 quarts daily) corresponds closely to an average purchase in November 1948 (1.38 quarts daily) of bottled milk per household, computed from market-wide utilization and Census data; or

   The number of customers served on the four routes in the sample represented nearly the same percentage of the estimated total number of households in the marketing area (1.49 percent) that the total milk sales in the sample were of total milk delivered to homes in the entire marketing area (1.43 percent).

2. Average selling prices computed from the route data according to the Superior plan compared favorably with independent information on the average of prices received by a handler selling in Superior.

3. There was little variation between routes. The cumulative frequency curve for each of the four routes closely corresponded to the curve for the four routes combined (Appendix fig. 7).

If the route sample, then, is accepted as representative of the market, the data may be used as a basis for computing an average price received by handlers under a multiple-unit pricing plan on the basis of certain predetermined conditions.

Duluth Discount Plan

In order to compute an average price which he would receive under the Duluth plan, a handler need only determine (a) the total quantity sold to those customers who would be entitled to the reduced price, and (b) the remaining sales, which would be subject to the higher price. He can then compute the average price by finding the percentage that each of these is of total milk and multiplying them by the respective prices. For example, in November 1948 the quantity price of standard milk in Duluth was 19 cents, whereas the regular price was 20 cents. On the four routes in the sample, 16.3 percent of the milk was sold to customers buying 90 quarts or more, leaving 83.7 percent of the milk sold at the regular price. These percentages, applied to the respective prices, give an average price of 19.84 cents per quart.

Superior Discount Plan

The computation of an average price under the Superior plan presents slightly more difficulty, as most customers would purchase a part of their milk at the higher price and the remainder at the lower price. The sample data did not disclose how many customers received deliveries on some basis other than on alternate days. It is possible that some customers actually received milk only every fourth day, or at even less frequent intervals. However, it is not probable that much milk was sold on a basis other than on alternate days. The route data were for a month having 31 days, so that some customers would have had milk delivered on 15 days and others on 16 days. It was therefore assumed that 15 1/2 quarts per customer, on an average, were subject to the price (21 cents in November 1948) applicable to the first quart delivered at a stop, and that all additional purchases were subject to the reduced price.

Estimating proportion subject to discount

Formula method. On the above assumption a formula was worked out for computing from information readily available to any handler the proportion of milk subject to discount under the plan used in Superior:

T represents the total quarts of milk sold.

Q represents the total quantity (in quarts) sold to customers eligible for the reduced price on part of their purchases.

M represents the minimum number of quarts subject to the higher price.

C represents the number of customers purchasing the milk represented by Q.

The quantity of milk represented by Q can be most easily computed by first finding the quantity purchased by customers who receive no more than 1 quart of milk at any one delivery (and who are therefore not eligible for any discount), and subtracting this amount from the total sales (T).

The formula, then, may be expressed as follows:

$$\text{Proportion of milk subject to reduced prices} = \frac{Q - M \times C}{T}$$

The four routes in the sample served 657 customers who purchased a total of 27,524 quarts of milk. Of these, 118 customers bought 16 21/ or fewer quarts, a total of 1,367 quarts.

21/ In lieu of 15.5, assumed value of M.

Therefore:

Q is 26,157 (27,524 less 1,367)
C is 539 (657 less 118)
T is 27,524
M is assumed to be 15 1/2 (In a 31-day month, on every other day delivery, half of the customers would receive 15 deliveries and half 16, an average of 15.5.)

Working out the formula:

$$\frac{26,157 - (15.5 \times 539) \text{ or } 8,354.5}{27,524} = \frac{17,802.5}{27,524} = .647, \text{ or } 64.7\%$$

Using the prices prevailing in Superior in November 1948, 64.7 percent of the milk priced at 18 cents and 35.3 percent at 21 cents gives an average price of 19.06 cents.

Graphic method. When the average number of quarts purchased per customer was plotted cumulatively against the percentage of milk subject to the reduced price under the Superior plan (Appendix table 20), it was found that each of the four routes as well as the combined route data followed the same curve, and that this curve could be used as a ready means of determining the proportion of a handler's sales which would be subject to the discount price (fig. 6), as follows: Locate on the horizontal scale of the chart the average number of quarts purchased per customer. Follow vertically to the point of intersection with the curve and read from the vertical scale the percentage that would be sold at discount. The underlying assumption is, of course, that total sales are distributed in a pattern similar to that of the selected routes. 22/

Determination of price structure from desired average price

A handler may wish to know what price structure will give a predetermined average price. With the aid of the chart, he need only make a few simple calculations to find the answer to this problem.

Suppose he determines that he needs an average selling price of approximately 20 cents and is considering the adoption of the Superior plan, with a 3-cent differential. Assuming that his customers purchase (and will continue to purchase) an average of 33.5 quarts monthly, the handler will find from the chart that 55 percent of his sales would be subject to the price differential, leaving 45 percent subject to the single quart price. He could compute the necessary prices as follows:

22/ In certain situations a determination made from the chart might deviate measurably from an exact determination -- the possible deviation is greatest when the average purchase per customer is very small.

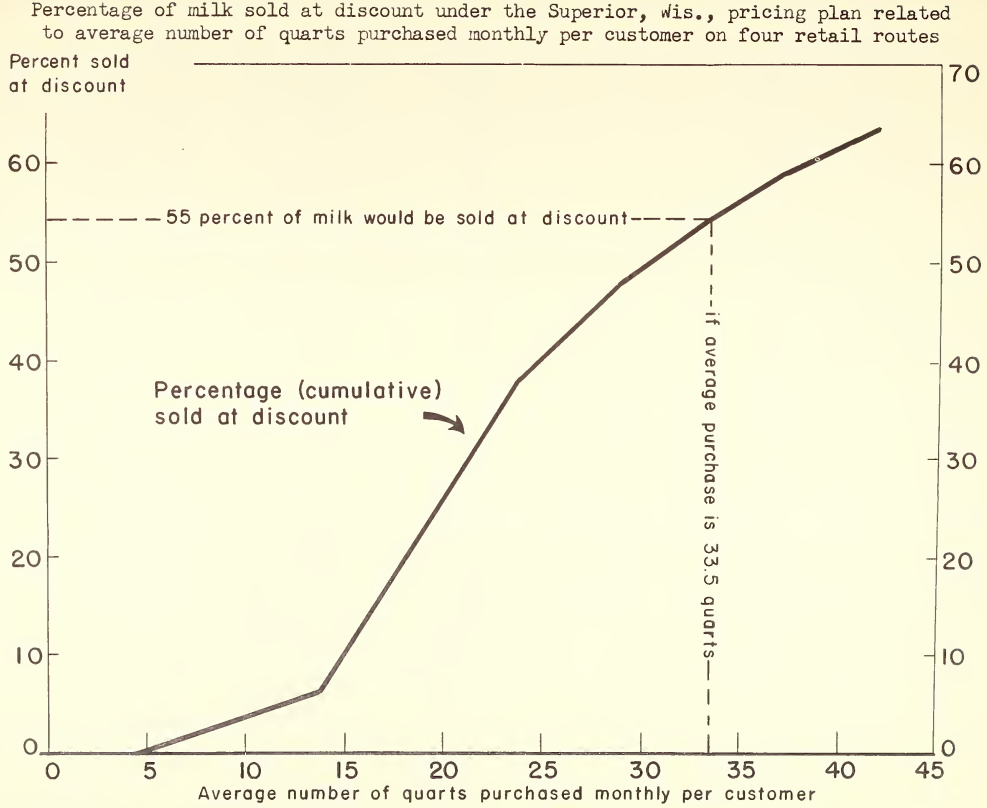

Figure 6.--Average monthly purchase per customer determines percentage sold at discount.

P represents the single quart price

$$.45\ P + .55\ (P - .03) = .20$$
$$.45\ P + .55\ P - .0165 = .20$$
$$1.0\ P = .20 + .0165 \text{ or } .2165$$

(Proof: 45% of .2165 + 55% of .1865 = .20)

Therefore, the single quart price would be 21.65 cents, and the price on each additional quart delivered at the same stop would be 18.65 cents.

Since 21.65 would be an awkward price, however, it might be desirable to find a different discount which, when applied to the above price rounded to the nearest cent (22 cents), will provide the 20-cent average. This problem can be solved as follows:

D represents the differential or discount

$$.45\ (.22) + .55\ (.22 - D) = .20$$
$$.099 + .121 - .55\ D = .20$$
$$.22 - .20 = .55\ D$$
$$.02 = .55\ D$$
$$D = \frac{.02}{.55} = .0364$$

This differential, rounded to the nearest half cent, would be 3.5 cents, and the discount price would be 18.5 cents. Thus, the weighting of the prices would give the following result:

45% at 22 cents + 55% at 18.5 cents = 20.075 cents

It must be kept in mind, of course, that any change in the relationship of the single quart price to the multiple-unit price (resulting from a change in differential) could alter the proportion of milk sold at discount. However, this relationship may also be affected by a change in price without a corresponding change in the differential, so that a certain amount of trial and error is probably inevitable.

Changes in the average purchase per customer (and consequent changes in the percentage which would be sold at discount) could also result from other factors, as for example, material changes in the price of milk sold at stores in relation to the price of milk delivered to homes. It is impossible, however, within the limitations of this study to make any determination of the effect of changes other than those directly affecting handlers.

APPENDIX A

Detailed Statistical Data

Table 11.--Percentage of total, wholesale, and retail sales of fluid milk by type of milk and container size, Duluth-Superior marketing area, May and November, 1947 and 1948 1/

Item	May 1947			November 1947			May 1948			November 1948		
	All sales	Wholesale	Retail	All sales	Wholesale	Retail	All sales	Wholesale	Retail	All sales	Wholesale	Retail
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Standard:												
Bulk	6.0	8.8	0.1	5.7	8.2	-	5.4	7.8	5/	5.5	7.8	-
Quarts 2/	86.1	81.2	96.6	86.4	81.7	96.8	86.1	81.5	96.3	86.3	81.8	96.9
Pints and half pints	6.0	8.6	.3	5.9	8.4	.3	6.2	8.8	.5	6.4	9.0	.4
All sizes	98.1	98.6	97.0	98.0	98.3	97.1	97.7	98.1	96.8	98.2	98.6	97.3
Flavored milk drinks: 3/												
Quarts	.6	.6	.7	.7	.6	.7	.9	.8	.9	.6	.6	.6
Pints and half pints 4/	.4	.5	.1	.5	.7	.1	.5	.7	.2	.4	.5	.1
All sizes	1.0	1.1	.8	1.2	1.3	.8	1.4	1.5	1.1	1.0	1.1	.7
Golden Guernsey and skim milk:												
All sizes	.9	.3	2.2	.8	.4	2.1	.9	.4	2.1	.8	.3	2.0
Total, all fluid milk	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
All types of milk:												
Bulk	6.1	9.0	.1	5.9	8.5	-	5.7	8.2	5/	5.6	8.0	-
Quarts	87.6	82.0	99.5	87.8	82.5	99.6	87.7	82.5	99.3	87.6	82.5	99.6
Pints	.9	1.0	.4	1.1	1.5	.4	1.3	1.6	.7	1.5	2.0	.4
Half pints	5.4	8.0	5/	5.2	7.5	5/	5.3	7.7	5/	5.3	7.5	5/
Total, all fluid milk	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

1/ Includes some sales outside marketing area.
2/ Sales at one handler's retail stores classified as wholesale; thus, "wholesale" represents total sales to customers at stores and "retail" represents total milk delivered to customers' homes.
3/ Includes some flavored whole milk.
4/ Includes small quantities of flavored milk sold in bulk.
5/ Less than 0.05 percent.

Table 12.--Percentage distribution of fluid milk sales between wholesale and retail, by type of milk, Duluth-Superior marketing area, May and November, 1947 and 1948 1/

Item	May 1947		November 1947		May 1948		November 1948	
	Wholesale: Percent	Retail: Percent	Wholesale: Percent	Retail: Percent	Wholesale: Percent	Retail: Percent	Wholesale: Percent	Retail: Percent
Standard:								
Quart sales 2/	64.2	35.8	65.4	34.6	65.5	34.5	66.8	33.2
All sizes	68.4	31.6	69.4	30.6	69.4	30.6	70.7	29.3
Flavored milk drinks: 3/								
All sizes	73.8	26.2	78.6	21.4	75.9	24.1	77.7	22.3
Golden Guernsey:								
Quarts 4/	16.8	83.2	15.2	84.8	14.7	85.3	12.2	87.8
Skim milk:								
All sizes	83.8	16.2	92.2	7.8	87.5	12.5	78.7	21.3
All milk:	68.1	31.9	69.1	30.9	69.2	30.8	70.4	29.6

1/ Includes some sales outside marketing area.

2/ Sales at one handler's retail stores classified as wholesale: thus "wholesale" represents total sales to customers at stores and "retail" represents total milk delivered to customers' homes.

3/ Includes some flavored whole milk.

4/ Golden Guernsey was sold in quart containers only.

Table 13.--Selling prices: Prevailing retail and wholesale milk prices per unit, Duluth-Superior marketing area, by months, 1947 and 1948 1/

Item	1947											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents
Retail, delivered to homes												
Standard:												
Quart												
Duluth												
1-2 quarts	16.5	16.5	16.5	16.5	15.5	15.5	15.5	16.5	17.5	18.0	18.0	18.0
3 quarts or more 2/	15.5	15.5	15.5	15.5	14.5	14.5	14.5	15.5	16.5	17.0	17.0	17.0
Cloquet	15.5	15.5	15.5	15.5	14.5	14.5	14.5	15.5	16.5	17.0	17.0	17.0
Superior												
1st quart	16.5	16.5	16.5	16.5	16.0	16.0	16.0	17.0	18.0	18.5	19.0	19.0
Additional, same stop	15.5	15.5	15.5	15.5	14.0	14.0	14.0	15.0	16.0	16.5	16.0	16.0
Pint					9.0				10.0	10.0	10.0	10.0
Half pint					5.0				6.0	6.0	6.0	6.0
Golden Guernsey:												
Quart					16.5-17.0	16.5-17.0	16.5-17.0	17.5-18.0	18.5-19.0	19.0-19.5	19.0-19.5	19.0-19.5
Skim:												
Quart	10.0	10.0	10.0	10.0	9.0	9.0	9.0	9.0	15.0	15.0	15.0	15.0
Retail, at handler's stores												
Standard:												
Single quart	14.0	14.0	14.0	14.0	13.0	13.0	12.0	13.5	15.0	15.0	15.0	15.0
Two quarts	27.0	27.0	27.0	27.0	25.0	25.0	--	--	29.0	--	--	--
Wholesale												
Standard:												
Gallon												
1-2 gallons	52.0	52.0	52.0	52.0	50.0	50.0	50.0	52.0	56.0	58.0	58.0	58.0
3 gallons or more	50.0	50.0	50.0	50.0	48.0	48.0	48.0	50.0	54.0	56.0	56.0	56.0
Quart												
Duluth	13.5	13.5	13.5	13.5	12.5	12.5	12.5	13.5	14.5	15.0	15.0	15.0
Cloquet	13.0	13.0	13.0	13.0	12.0	12.0	12.0	13.0	14.0	14.5	14.5	14.5
Superior	13.5	13.5	13.5	13.5	12.5	12.5	12.5	13.5	14.5	15.0	15.0	15.0
Pint					7.5				8.5	8.5	8.5	8.5
Half pint	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.25	4.25	4.5	4.5	4.5
Golden Guernsey:												
Quart					13.5	13.5	13.5	14.5	15.5	16.0	16.0	16.0
Flavored: 3/												
Quart	13.0	13.0	13.0	13.0	12.5	12.5	12.5	13.5	14.5	15.0	15.0	15.0
Pint									8.5	8.5	8.5	8.5
Half pint									4.5	4.5	4.5	4.5
Skim:												
Gallon									35.0	35.0	35.0	35.0
Quart	8.0	8.0	8.0	8.0	7.0	7.0	7.0	7.0	12.0	12.0	12.0	12.0

See footnotes at end of table.

Table 13.--Selling prices: Prevailing retail and wholesale milk prices per unit, Duluth-Superior marketing area, by months, 1947 and 1948 1/ -Continued

Item	1948											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents
Retail, delivered to homes												
Standard:												
Quart												
Duluth												
1-2 quarts	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	20.0	20.0	20.0	20.0
3 quarts or more 2/	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	19.0	19.0	19.0	19.0
Cloquet	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	20.0	20.0	20.0	20.0
Superior												
1st quart	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	21.0	21.0	21.0	21.0
Additional, same stop	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	18.0	18.0	18.0	18.0
Pint	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	11.0	11.0	11.0	11.0
Half pint	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.5	6.5	6.5	6.5
Golden Guernsey:												
Quart	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	21.0	21.0	21.0	21.0
Skim:												
Quart	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	16.0	16.0	16.0	16.0
Retail, at handler's stores												
Standard:												
Quart	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	17.0	17.0	17.0	17.0
Wholesale												
Standard:												
Gallon												
1-2 gallons	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	66.0	66.0	66.0	66.0
3 gallons or more	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	64.0	64.0	64.0	64.0
Quart												
Duluth	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	17.0	17.0	17.0	17.0
Cloquet	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	17.0	17.0	17.0	17.0
Superior	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	17.0	17.0	17.0	17.0
Pint	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	9.5	9.5	9.5	9.5
Half pint	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	5.0	5.0	5.0	5.0
Golden Guernsey:												
Quart	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	18.0	18.0	18.0	18.0
Flavored: 3/												
Quart	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	17.0	17.0	17.0	17.0
Pint	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	9.5	9.5	9.5	9.5
Half pint	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	5.0	5.0	5.0	5.0
Skim:												
Gallon	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	39.0	39.0	39.0	39.0
Quart	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	13.0	13.0	13.0	13.0

1/ Prices are the same for paper and glass.
2/ Computed on monthly basis. All milk is billed at a 1 cent discount to customers buying 90 quarts or more in month.
3/ Includes flavored part skim drinks and flavored whole milk.

Table 14.--Estimated weighted averages of selling prices of all fluid milk sales, cost of milk, and margins, in cents per quart, Duluth-Superior marketing area, 1947 and 1948

Year and month	Estimated average selling price 1/	Estimated cost of milk 2/	Estimated margin	
			Amount per quart	Percent of selling price 3/
	Cents	Cents	Cents	Percent
1947				
January	14.5	11.0	3.5	24.1
February	14.5	9.8	4.7	32.4
March	14.5	9.4	5.1	35.2
April	14.5	9.6	4.9	33.8
May	13.5	7.7	5.8	43.2
June	13.5	7.4	6.1	45.2
July	13.5	7.6	5.9	43.7
August	14.5	8.1	6.4	44.1
September	15.5	9.5	6.0	38.7
October	15.9	10.1	5.8	36.5
November	15.9	9.5	6.4	40.4
December	15.9	10.2	5.7	35.8
Average	14.7	9.2	5.5	37.4
1948				
January	16.8	11.1	5.7	33.9
February	16.8	11.2	5.6	33.3
March	16.8	11.2	5.6	33.3
April	16.8	10.7	6.1	36.3
May	16.8	10.2	6.6	39.5
June	16.8	9.9	6.9	41.1
July	16.8	10.1	6.7	39.9
August	16.8	10.0	6.8	40.5
September	17.9	10.6	7.3	40.8
October	17.9	10.5	7.4	41.3
November	17.9	9.7	8.2	46.0
December	17.9	9.4	8.5	47.5
Average	17.2	10.4	6.8	39.5

1/ Computed May and November prices of each year were used as bench marks in estimating average prices for the remaining months.

2/ Cost of milk for months other than May and November of each year was estimated on the assumption that the average butterfat content of milk sold was 3.5 percent, and the average rate per hundredweight of premiums and administration assessments was 4.1 cents per hundredweight.

3/ Percentages for May and November of each year computed from data in table 18.

Table 15.--Minimum Class I prices per hundredweight and per quart of milk containing 4.0 percent butterfat, and butterfat differential per 1/10 of 1 percent variation from 4.0 percent, Duluth-Superior marketing area, 1947 and 1948

Year and month	Class I price		Butterfat differential
	Per cwt.	Per qt.	per 1/10 percent
	Dollars	Cents	Cents
1947			
January	5.590	12.0	10.1
February	4.965	10.7	8.6
March	4.750	10.2	8.4
April	4.849	10.4	8.9
May	3.913	8.4	7.8
June	3.780	8.1	7.5
July	3.892	8.4	7.8
August	4.147	8.9	8.4
September	4.821	10.4	9.1
October	5.167	11.1	9.9
November	4.753	10.2	8.8
December	5.190	11.2	9.8
Simple average	4.651	10.0	8.8
1948			
January	5.660	12.2	10.7
February	5.699	12.3	10.5
March	5.681	12.2	10.4
April	5.428	11.7	9.7
May	5.217	11.2	10.3
June	5.070	10.9	9.9
July	5.165	11.1	10.1
August	5.127	11.0	10.0
September	5.384	11.6	9.5
October	5.321	11.4	9.2
November	4.851	10.4	8.1
December	4.728	10.2	7.7
Simple average	5.278	11.3	9.7

Table 16.--Butterfat content: Weighted average and selected ranges of percentages of butterfat in fluid milk, by channel of sale, type of milk, and container size, Duluth-Superior marketing area, May and November, 1947 and 1948

Item	May 1947	November 1947	May 1948	November 1948
	Percent	Percent	Percent	Percent
Retail				
Standard:				
All container sizes				
Range	3.45-3.90	3.46-3.956	3.40-3.94	3.40-4.044
Weighted average	3.546	3.592	3.544	3.546
Quarts				
Entire market	3.546	3.592	3.544	3.545
Duluth	3.545	3.602	3.539	3.534
Superior	3.515	3.492	3.500	3.490
Cloquet	3.618	3.712	3.658	3.720
Pints	3.497	3.602	3.578	3.563
Half pints	3.499	3.600	3.585	3.556
Golden Guernsey:				
Quarts	4.749	4.379	4.338	4.352
Flavored:				
All container sizes				
Range	0-2.00	0-3.63	0-3.59	.86-3.60
Weighted average	1.268	1.670	1.557	1.701
Quarts				
Entire market	1.224	1.652	1.551	1.750
Duluth	1.229	1.711	1.595	1.776
Superior	1/	2.000	1.999	1.757
Cloquet	1/	1/	1/	1/
Skim:				
All container sizes	0	0	0	0
All retail	3.551	3.592	3.536	3.543

See footnote at end of table.

Table 16.--Butterfat content: Weighted average and selected ranges of percentages of butterfat in fluid milk, by channel of sale, type of milk, and container size, Duluth-Superior marketing area, May and November, 1947 and 1948--Continued

Item	May 1947	November 1947	May 1948	November 1948
	Percent	Percent	Percent	Percent
Wholesale				
Standard:				
All container sizes				
Range	3.45-3.90	3.46-3.956	3.40-3.94	3.40-4.044
Weighted average	3.508	3.555	3.522	3.504
Bulk	3.499	3.539	3.515	3.503
Quarts				
Entire market	3.510	3.554	3.521	3.501
Duluth	3.503	3.565	3.522	3.500
Superior	3.525	3.489	3.500	3.487
Cloquet	3.587	3.655	3.589	3.600
Pints	3.483	3.597	3.534	3.524
Half pints	3.490	3.577	3.537	3.529
Golden Guernsey:				
Quarts	4.575	4.417	4.302	4.319
Flavored:				
All container sizes				
Range	0-2.0	0-2.0	0-2.05	.86-3.60
Weighted average	1.373	1.789	1.669	1.712
Quarts				
Entire market	1.371	1.835	1.739	1.633
Duluth	1.197	1.893	1.763	1.553
Superior	1/	2.000	2.000	1.798
Cloquet	1/	1/	1/	1/
Pints	.925	1.331	.912	1.482
Half pints	1.465	1.806	1.681	1.948
Skim:				
All container sizes	0	0	0	0
All wholesale	3.481	3.527	3.487	3.479
All fluid milk, retail and wholesale	3.503	3.547	3.502	3.498

1/ Not shown to avoid revealing information about individual handlers.

Table 17.--Cost of milk: Weighted averages and selected ranges of cost per quart of fluid milk, by channel of sale, type of milk, and container size, Duluth-Superior marketing area, May and November, 1947 and 1948 1/

Item	May 1947	November 1947	May 1948	November 1948
	Cents	Cents	Cents	Cents
Retail				
Standard:				
All container sizes				
Range	7.56-8.31	9.31-10.24	9.95-11.14	9.50-10.62
Weighted average	7.72	9.55	10.27	9.75
Quarts				
Entire market	7.72	9.55	10.27	9.75
Duluth	7.72	9.57	10.26	9.74
Superior	7.67	9.37	10.17	9.66
Cloquet	7.84	9.78	10.52	10.06
Pints	7.64	9.57	10.34	9.78
Half pints	7.64	9.57	10.36	9.77
Golden Guernsey:				
Quarts	9.74	11.04	12.23	11.25
Flavored: 2/				
All container sizes				
Range	1.77-5.13	2.76-9.63	2.42-10.37	5.08-9.85
Weighted average	3.90	5.92	5.87	6.54
Quarts				
Entire market	3.82	5.88	5.85	6.63
Duluth	3.83	6.00	5.95	6.67
Superior	2/	6.54	6.85	6.64
Cloquet	3/	3/	3/	3/
Pints	4.27	6.10	6.02	5.87
Half pints	3.45	6.54	4.30	5.92
Skim:				
All container sizes	1.77	2.76	2.42	3.58
All retail	7.73	9.55	10.25	9.75

See footnotes at end of table.

Table 17.--Cost of milk: Weighted averages and selected ranges of cost per quart of fluid milk, by channel of sale, type of milk, and container size, Duluth-Superior marketing area, May and November, 1947 and 1948 1/ -Continued

Item	May 1947	November 1947	May 1948	November 1948
	Cents	Cents	Cents	Cents
Wholesale				
Standard:				
All container sizes				
Range	7.56-8.31	9.31-10.24	9.95-11.14	9.50-10.62
Weighted average	7.65	9.48	10.22	9.68
Bulk	7.64	9.45	10.20	9.68
Quarts				
Entire market	7.66	9.48	10.22	9.68
Duluth	7.65	9.50	10.22	9.68
Superior	7.68	9.36	10.17	9.65
Cloquet	7.79	9.67	10.37	9.85
Pints	7.61	9.56	10.24	9.72
Half pints	7.62	9.53	10.25	9.72
Golden Guernsey:				
Quarts	9.44	11.12	12.15	11.20
Flavored:				
All container sizes				
Range	1.77-5.13	2.76-6.54	2.42-6.96	5.08-9.85
Weighted average	4.07	6.14	6.11	6.56
Quarts				
Entire market	4.07	6.23	6.27	6.42
Duluth	3.78	6.34	6.32	6.28
Superior	3/	6.54	6.85	6.71
Cloquet	3/	3/	3/	3/
Pints	3.32	5.28	4.44	6.16
Half pints	4.23	6.17	6.14	6.97
Skim:				
All container sizes	1.77	2.76	2.42	3.58
All wholesale	7.61	9.43	10.14	9.64
All fluid milk, retail and wholesale	7.65	9.47	10.17	9.67

1/ Milk cost is based on Class I price adjusted for butterfat content of milk sold, and reflects premiums and administration fees paid by handlers.

2/ Cost of flavoring materials not included in cost.

3/ Not shown to avoid revealing information about individual handlers.

Table 18.--Margins: Weighted averages and selected ranges of selling prices, costs, and margins per quart of fluid milk, by channel of sale, type of milk, and container size, Duluth-Superior marketing area, May and November, 1947 and 1948

Item	May 1947			November 1947			May 1948			November 1948		
	Selling price	Cost	Margin	Selling price	Cost	Margin	Selling price	Cost	Margin	Selling price	Cost	Margin
	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents
Retail												
Standard:												
All container sizes												
Weighted average	15.16	7.72	7.44	17.62	9.55	8.07	18.62	10.27	8.35	19.73	9.75	9.98
Range 1/		7.56-8.31	6.85-7.60		9.31-10.24	7.38-8.31		9.95-11.14	7.48-8.67		9.50-10.62	9.11-10.23
Quarts												
Entire market	15.15	7.72	7.43	17.61	9.55	8.06	18.61	10.27	8.34	19.72	9.75	9.97
Duluth												
1-2 quarts	15.50	7.72	7.78	18.00	9.57	8.43	19.00	10.26	8.74	20.00	9.74	10.26
3 quarts or more 2/	14.50	7.72	6.78	17.00	9.57	7.43	18.00	10.26	7.74	19.00	9.74	9.26
Average sale	15.34	7.72	7.62	17.84	9.57	8.27	18.84	10.26	8.58	19.84	9.74	10.10
Superior												
Single quart	16.00	7.67	8.33	19.00	9.37	9.63	20.00	10.17	9.83	21.00	9.66	11.34
All over one stop	14.00	7.67	6.33	16.00	9.37	6.63	17.00	10.17	6.83	18.00	9.66	8.34
Average sale	14.71	7.67	7.04	17.06	9.37	7.69	18.06	10.17	7.89	19.06	9.66	9.40
Cloquet	14.50	7.84	6.66	17.00	9.78	7.22	18.00	10.52	7.48	20.00	10.06	9.94
Pints	18.00	7.64	10.36	20.00	9.57	10.43	20.00	10.34	9.66	22.00	9.78	12.22
Half pints	20.00	7.64	12.36	24.00	9.57	14.43	24.00	10.36	13.64	26.00	9.77	16.23
Golden Guernsey:												
Quarts	16.75	9.74	7.01	19.25	11.04	8.21	20.00	12.23	7.77	21.00	11.25	9.75
Flavored:												
All container sizes												
Weighted average	15.67	3.90	11.77	17.99	5.92	12.07	18.92	5.87	13.05	20.01	6.54	13.47
Range 1/		1.77-5.13	10.54-13.90		2.76-9.63	8.36-15.23		2.42-10.37	8.55-16.50		5.08-9.85	10.16-14.93
Quarts												
Entire market	15.21	3.82	11.39	17.62	5.88	11.74	18.67	5.85	12.82	19.73	6.63	13.10
Duluth												
Single quart	15.50	3.83	11.67	18.00	6.00	12.00	19.00	5.95	13.05	20.00	6.67	13.33
90 or more	14.50	3.83	10.67	17.00	6.00	11.00	18.00	5.95	12.05	19.00	6.67	12.33
Average sale	15.34	3.83	11.51	17.84	6.00	11.84	18.84	5.95	12.89	19.84	6.67	13.17
Superior												
Single quart	16.00	3/3.82	12.18	19.00	6.54	12.46	20.00	6.85	13.15	21.00	6.64	14.36
All over one stop	14.00	3/3.82	10.18	16.00	6.54	9.46	17.00	6.85	10.15	18.00	6.64	11.36
Average sale	14.71	3/3.82	10.89	17.06	6.54	10.52	18.06	6.85	11.21	19.06	6.64	12.42
Cloquet	14.50	3/3.82	10.68	17.00	3/5.88	11.12	18.00	3/5.85	12.15	20.00	3/6.63	13.37
Pints	18.00	4.27	13.73	20.00	6.10	13.90	20.00	6.02	13.98	22.00	5.87	16.13
Half pints	20.00	3.45	16.55	24.00	6.54	17.46	24.00	4.30	19.70	26.00	5.92	20.08
Skim:												
Quarts	9.00	1.77	7.23	15.00	2.76	12.24	15.00	2.42	12.58	16.00	3.58	12.42
All retail	15.20	7.73	7.47	17.66	9.55	8.11	18.65	10.25	8.40	19.75	9.75	10.00

See footnotes at end of table.

Table 18.--Margins: Weighted averages and selected ranges of selling prices, costs, and margins per quart of fluid milk, by channel of sale, type of milk, and container size, Duluth-Superior marketing area, May and November, 1947 and 1948--Continued

Item	May 1947			November 1947			May 1948			November 1948		
	Selling price	Cost	Margin	Selling price	Cost	Margin	Selling price	Cost	Margin	Selling price	Cost	Margin
	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents
Wholesale												
Standard:												
All container sizes												
Weighted average	12.68	7.65	5.03	15.09	9.48	5.61	16.01	10.22	5.79	17.12	9.68	7.44
Range 1/		7.56-8.31	4.37-5.12		9.31-10.24	4.85-5.78		9.95-11.14	4.87-6.06		9.50-10.62	6.50-7.62
Bulk	12.00	7.64	4.36	14.00	9.45	4.55	15.00	10.20	4.80	16.00	9.68	6.32
Quarts												
Entire market	12.49	7.66	4.83	14.98	9.48	5.50	15.98	10.22	5.76	17.00	9.68	7.32
Duluth	12.51	7.65	4.86	15.00	9.50	5.50	16.00	10.22	5.78	17.00	9.68	7.32
Superior	12.50	7.68	4.82	15.00	9.36	5.64	16.00	10.17	5.83	17.00	9.65	7.35
Cloquet	12.00	7.79	4.21	14.50	9.67	4.83	15.50	10.37	5.13	17.00	9.85	7.15
Pints	15.00	7.61	7.39	17.00	9.56	7.44	17.00	10.24	6.76	19.00	9.72	9.28
Half pints												
All sales	15.20	7.62	7.58	17.20	9.53	7.67	17.20	10.25	6.95	19.20	9.72	9.48
To schools	15.00	7.62	7.38	17.00	9.53	7.47	17.00	10.25	6.75	19.00	9.72	9.28
Other	16.00	7.62	8.38	18.00	9.53	8.47	18.00	10.25	7.75	20.00	9.72	10.28
Golden Guernsey:												
Quarts	13.50	9.44	4.06	16.00	11.12	4.88	17.00	12.15	4.85	18.00	11.20	6.80
Flavored:												
All container sizes												
Weighted average	13.56	4.07	9.49	15.70	6.14	9.56	16.26	6.11	10.15	17.98	6.56	11.42
Range 1/		1.77-5.13	8.43-11.79		2.76-6.54	9.16-12.94		2.42-6.96	9.30-13.84		5.08-9.85	8.13-12.90
Quarts												
Entire market	12.45	4.07	8.38	14.95	6.23	8.72	15.96	6.27	9.69	17.00	6.42	10.58
Duluth	12.50	3.78	8.72	15.00	6.34	8.66	16.00	6.32	9.68	17.00	6.28	10.72
Superior	12.50	3/4.07	8.43	15.00	6.54	8.46	16.00	6.85	9.15	17.00	6.71	10.29
Cloquet	12.00	3/4.07	7.93	14.50	3/6.23	8.27	15.50	3/6.27	9.23	17.00	3/6.42	10.58
Pints	15.00	3.32	11.68	17.00	5.28	11.72	17.00	4.44	12.56	19.00	6.16	12.84
Half pints												
All sales	15.20	4.23	10.97	17.20	6.17	11.03	17.20	6.14	11.06	19.20	6.97	12.23
To schools	15.00	4.23	10.77	17.00	6.17	10.83	17.00	6.14	10.86	19.00	6.97	12.03
Other	16.00	4.23	11.77	18.00	6.17	11.83	18.00	6.14	11.86	20.00	6.97	13.03
Skim:												
All container sizes	3.80	1.77	2.03	8.90	2.76	6.14	8.87	2.42	6.45	9.80	3.58	6.22
Bulk	3.75	1.77	1.98	8.75	2.76	5.99	8.75	2.42	6.33	9.75	3.58	6.17
Quarts	7.00	1.77	5.23	12.00	2.76	9.24	12.00	2.42	9.58	13.00	3.58	9.42
All wholesale	12.68	7.61	5.07	15.08	9.43	5.65	16.00	10.14	5.86	17.12	9.64	7.48
All fluid milk retail and wholesale	13.48	7.65	5.83	15.88	9.47	6.41	16.82	10.17	6.65	17.90	9.67	8.23

1/ Ranges of margins are based on weighted average selling prices.
2/ Price applied on monthly basis to all milk purchased by customers buying 90 quarts or more.
3/ Market average used to avoid revealing information about individual handlers.

Table 19.--Simple average selling prices of milk sold at retail in Duluth or Superior, Class I price of 4 percent milk, and simple price spreads, in cents per quart, 1947 and 1948

Year and month	Average selling prices 1/	Class I price of 4 percent milk	Simple price spreads
	Cents	Cents	Cents
1947			
January	16.0	12.0	4.0
February	16.0	10.7	5.3
March	16.0	10.2	5.8
April	16.0	10.4	5.6
May	15.0	8.4	6.6
June	15.0	8.1	6.9
July	15.0	8.4	6.6
August	16.0	8.9	7.1
September	17.0	10.4	6.6
October	17.5	11.1	6.4
November	17.5	10.2	7.3
December	17.5	11.2	6.3
Average	16.2	10.0	6.2
1948			
January	18.5	12.2	6.3
February	18.5	12.3	6.2
March	18.5	12.2	6.3
April	18.5	11.7	6.8
May	18.5	11.2	7.3
June	18.5	10.9	7.6
July	18.5	11.1	7.4
August	18.5	11.0	7.5
September	19.5	11.6	7.9
October	19.5	11.4	8.1
November	19.5	10.4	9.1
December	19.5	10.2	9.3
Average	18.8	11.3	7.5

1/ Simple average of single-unit and multiple-unit prices. (See table 13.)

Table 20.--Average monthly purchase in quarts per retail customer on four selected routes in Duluth, Minn., and percentage subject to discount under the Superior, Wis., pricing plan, by size of monthly purchase, December 1948

Monthly purchase per customer (quarts)	Average monthly purchase per customer		Cumulative average monthly purchase per customer	
	Quantity	Percentage subject to discount 1/	Quantity	Percentage subject to discount 1/
	Quarts	Percent	Quarts	Percent
1 - 7	4.2	0	4.2	0
8 - 23	15.5	6.9	13.8	6.6
24 - 39	31.4	49.0	23.6	38.1
40 - 55	47.1	66.0	28.8	48.3
56 - 71	63.2	74.7	33.6	55.1
72 - 87	78.7	79.7	37.3	59.4
88 -103	93.6	82.9	40.0	62.0
104 -119	110.8	85.6	40.4	62.4
120 -135	125.2	87.2	41.2	63.1
136 -151	--	--	41.2	63.1
152 -167	--	--	41.2	63.1
168 -183	171.0	90.6	41.4	63.3
184 -199	192.0	91.7	41.6	63.5
200 -215	209.0	92.3	41.9	2/ 63.7

1/ See pp. 34-38 of text.

2/ This table was constructed from data for four routes which made 16 deliveries during the month. This fact accounts for the slight discrepancy from the percentage estimated on page 36 which is based on an average of 15.5 deliveries.

APPENDIX B

An Illustration of the Computation of the Cost of Milk

The price for Class I milk containing 4 percent butterfat, as determined by the formula in Order 54, was $3.913 per hundredweight in May 1947.

Handlers paid total premiums amounting to $1,024 during that month. The total volume of milk received from producers was 9,089,000 pounds. Dividing $1,024 by the number of pounds of milk results in a premium payment of $0.011 per hundredweight.

Each handler paid, during the month of May 1947, as his share of the administration of Order 54, $0.02 per hundredweight for all milk received.

Accordingly, the handlers' total product cost of 3.5 percent milk utilized as Class I was as follows:

	Dollars per cwt.
Class I price for milk testing 4.0 percent ...	3.913
Premiums paid	.011
Administration assessment	.020
Total product cost of fluid milk, per cwt..	3.944

On the basis of the records of 14 handlers, the average butterfat content of all fluid milk sold within the marketing area was 3.50 percent.

For each tenth of 1 percent of butterfat below 4 percent in milk sold as fluid, a fixed differential of 7.8 cents per hundredweight was to be deducted from the Class I price.

To determine the price paid for milk of 3.50 percent butterfat, deduct 3.50 from 4.00 percent, which is 0.50 or five-tenths percent. Multiplying the butterfat differential of $0.078 by 5 gives $0.390. Deducting $0.390 from the total product cost of 3.944 gives $3.554 per hundredweight for milk containing 3.50 percent butterfat.

This adjusted per hundredweight cost multiplied by 2.15 and divided by 100 gives a cost per quart of 7.64 cents.

APPENDIX C

Supporting Charts

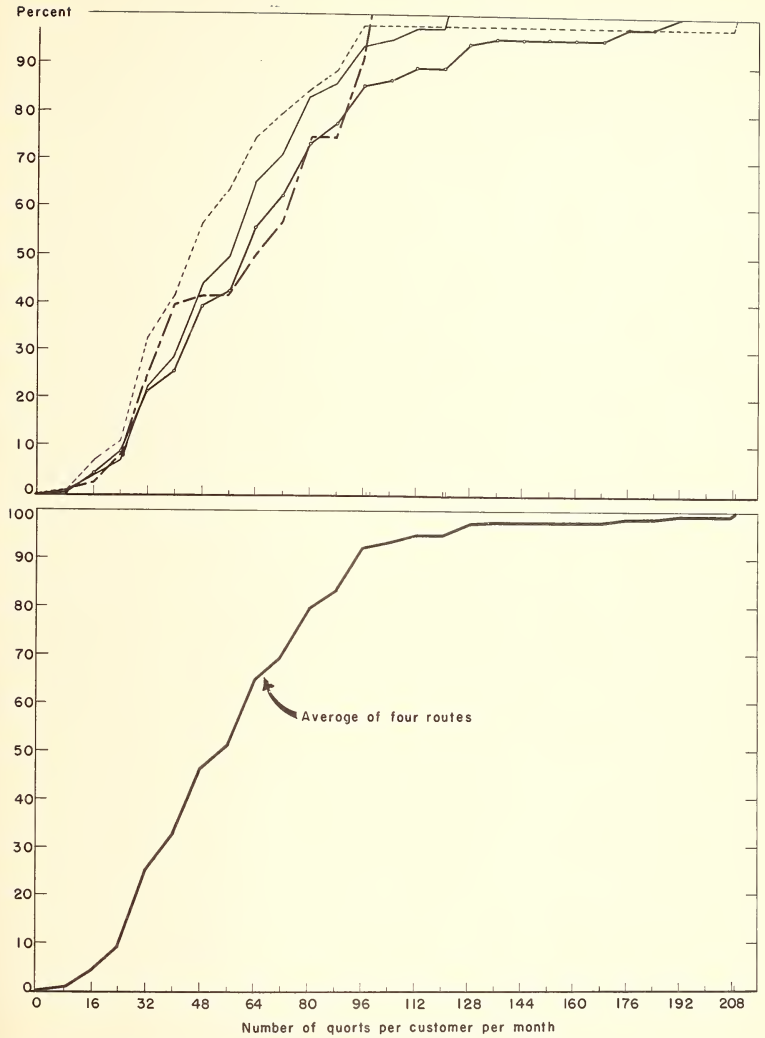

Figure 7.--Cumulative percentage of quart sales of milk on four selected retail routes by monthly purchase per customer, Duluth, Minn., December 1948.

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